

Appendix A. Thermal Conversion Factors

The heat content rates (i.e., thermal conversion factors) provided in this section represent the gross (or upper) energy content of the fuels. Gross heat content rates are applied in all British thermal unit (Btu) calculations for the *Monthly Energy Review* and are commonly used in energy calculations in the United States; net (or lower) heat content rates are typically used in European energy calculations. The difference between the two rates is the amount of energy that is consumed to vaporize water that is created during the combustion process. Generally, the difference ranges from 2 percent to 10 percent, depending on the specific fuel and its hydrogen content. Some fuels, such as unseasoned wood, can be more than 40 percent different in their gross and net heat content rates.

In general, the annual thermal conversion factors presented in Tables A1 through A6 are computed from final annual data. However, if current year final data are not available,

thermal conversion factors for the current year are computed from the best available data and labeled “preliminary.” Usually, the previous year’s factor is used as a preliminary value until data become available to calculate the factor appropriate to the year. The source of each factor is described in the section entitled “Thermal Conversion Factor Source Documentation,” which follows Table A6 in this appendix.

Thermal conversion factors for hydrocarbon mixes (Table A1) are weighted averages of the thermal conversion factors for each hydrocarbon included in the mix. For example, in calculating the thermal conversion factor for a 60-40 butane-propane mixture, the thermal conversion factor for butane is weighted 1.5 times more heavily than the thermal conversion factor for propane.

Table A1. Approximate Heat Content of Petroleum Products
(Million Btu per Barrel)

Petroleum Product	Heat Content	Petroleum Product	Heat Content
Asphalt	6.636	Pentanes Plus	4.620
Aviation Gasoline	5.048	Petrochemical Feedstocks	
Butane	4.326	Naphtha Less Than 401° F	5.248
Butane Propane Mixture ^a	4.130	Other Oils Equal to or Greater Than 401° F	5.825
Distillate Fuel Oil	5.825	Still Gas	6.000
Ethane	3.082	Petroleum Coke	6.024
Ethane-Propane Mixture ^b	3.308	Plant Condensate	5.418
Isobutane	3.974	Propane	3.836
Jet Fuel, Kerosene Type	5.670	Residual Fuel Oil	6.287
Jet Fuel, Naphtha Type	5.355	Road Oil	6.636
Kerosene	5.670	Special Naphthas	5.248
Lubricants	6.065	Still Gas	6.000
Motor Gasoline, Conventional	5.253	Unfinished Oils	5.825
Motor Gasoline, Reformulated	5.150	Unfractionated Stream	5.418
Motor Gasoline, Oxygenated	5.150	Waxes	5.537
Natural Gasoline and Isopentane	4.620	Miscellaneous	5.796

^a 60 percent butane and 40 percent propane.

^b 70 percent ethane and 30 percent propane.

Source: See “Thermal Conversion Factor Source Documentation,” which follows Table A6.

Table A2. Approximate Heat Content of Crude Oil, Crude Oil and Products, and Natural Gas Plant Liquids
(Million Btu per Barrel)

	Crude Oil			Crude Oil and Products		Natural Gas Plant Liquids Production
	Production	Imports	Exports	Imports	Exports	
1973	5.800	5.817	5.800	5.897	5.752	4.049
1974	5.800	5.827	5.800	5.884	5.774	4.011
1975	5.800	5.821	5.800	5.858	5.748	3.984
1976	5.800	5.808	5.800	5.856	5.745	3.964
1977	5.800	5.810	5.800	5.834	5.797	3.941
1978	5.800	5.802	5.800	5.839	5.808	3.925
1979	5.800	5.810	5.800	5.810	5.832	3.955
1980	5.800	5.812	5.800	5.796	5.820	3.914
1981	5.800	5.818	5.800	5.775	5.821	3.930
1982	5.800	5.826	5.800	5.775	5.820	3.872
1983	5.800	5.825	5.800	5.774	5.800	3.839
1984	5.800	5.823	5.800	5.745	5.850	3.812
1985	5.800	5.832	5.800	5.736	5.814	3.815
1986	5.800	5.903	5.800	5.808	5.832	3.797
1987	5.800	5.901	5.800	5.820	5.858	3.804
1988	5.800	5.900	5.800	5.820	5.840	3.800
1989	5.800	5.906	5.800	5.833	5.857	3.826
1990	5.800	5.934	5.800	5.849	5.833	3.822
1991	5.800	5.948	5.800	5.873	5.823	3.807
1992	5.800	5.953	5.800	5.877	5.777	3.804
1993	5.800	5.954	5.800	5.883	5.779	3.801
1994	5.800	5.950	5.800	5.861	5.779	3.794
1995	5.800	5.924	5.800	5.848	5.747	3.796
1996	5.800	5.935	5.800	5.842	5.741	3.777
1997	5.800	5.954	5.800	5.862	5.729	3.762
1998	5.800	5.953	5.800	5.862	5.715	3.769
1999 ^a	5.800	5.942	5.800	5.845	5.715	3.744
2000 ^a	5.800	5.942	5.800	5.845	5.715	3.744

^a Preliminary.

Note: Crude oil includes lease condensate.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A6.

Table A3. Approximate Heat Content of Petroleum Products, Weighted Averages
(Million Btu per Barrel)

	Consumption					Imports	Exports	Liquefied Petroleum Gases Consumption	Motor Gasoline Consumption
	Residential and Commercial	Industrial	Transportation	Electric Utilities	Total				
1973	5.387	5.568	5.395	6.245	5.515	5.983	5.752	3.746	5.253
1974	5.377	5.538	5.394	6.238	5.504	5.959	5.773	3.730	5.253
1975	5.358	5.528	5.392	6.250	5.494	5.935	5.747	3.715	5.253
1976	5.383	5.538	5.395	6.251	5.504	5.980	5.743	3.711	5.253
1977	5.389	5.555	5.400	6.249	5.518	5.908	5.796	3.677	5.253
1978	5.382	5.553	5.404	6.251	5.519	5.955	5.814	3.669	5.253
1979	5.471	5.418	5.428	6.258	5.494	5.811	5.864	3.680	5.253
1980	5.468	5.376	5.440	6.254	5.479	5.748	5.841	3.674	5.253
1981	5.409	5.313	5.432	6.258	5.448	5.659	5.837	3.643	5.253
1982	5.392	5.263	5.422	6.258	5.415	5.664	5.829	3.615	5.253
1983	5.286	5.273	5.415	6.255	5.406	5.677	5.800	3.614	5.253
1984	5.384	5.223	5.422	6.251	5.395	5.613	5.867	3.599	5.253
1985	5.326	5.221	5.423	6.247	5.387	5.572	5.819	3.603	5.253
1986	5.357	5.286	5.427	6.257	5.418	5.624	5.839	3.640	5.253
1987	5.316	5.253	5.430	6.249	5.403	5.599	5.860	3.659	5.253
1988	5.320	5.248	5.434	6.250	5.410	5.618	5.842	3.652	5.253
1989	5.257	5.233	5.440	6.241	5.410	5.641	5.869	3.683	5.253
1990	5.208	5.272	5.445	6.247	5.411	5.614	5.838	3.625	5.253
1991	5.163	5.192	5.442	6.248	5.384	5.636	5.827	3.614	5.253
1992	5.169	5.188	5.445	6.243	5.378	5.623	5.774	3.624	5.253
1993	5.148	5.200	5.438	6.241	5.379	5.620	5.777	3.606	5.253
1994	5.154	5.170	5.427	6.231	5.361	5.534	5.777	3.635	^b 5.230
1995	5.126	5.139	5.419	6.210	5.341	5.504	5.741	3.623	5.215
1996	5.101	5.125	5.421	6.212	5.336	5.489	5.733	3.613	5.216
1997	5.076	5.134	5.417	6.220	5.336	5.472	5.720	3.616	5.213
1998	5.045	5.154	5.415	6.220	5.349	5.465	5.704	3.614	5.212
1999 ^a	5.003	5.098	5.419	6.207	5.328	^R 5.447	5.703	3.616	^R 5.211
2000 ^a	5.003	5.098	5.419	6.207	5.328	^R 5.447	5.703	3.616	^R 5.211

^a Preliminary.

^b Beginning in 1994, the single constant factor is replaced with a quantity-weighted average of motor gasoline's major components. See Table A1.

R=Revised.

Note: Weighted averages of the products included in each category are calculated by using heat content values shown in Table A1.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A6.

Table A4. Approximate Heat Content of Natural Gas
(Btu per Cubic Foot)

	Production		Consumption			Imports	Exports
	Dry	Marketed	Sectors Other Than Electric Utilities	Electric Utilities	Total		
1973	1,021	1,093	1,020	1,024	1,021	1,026	1,023
1974	1,024	1,097	1,024	1,022	1,024	1,027	1,016
1975	1,021	1,095	1,020	1,026	1,021	1,026	1,014
1976	1,020	1,093	1,019	1,023	1,020	1,025	1,013
1977	1,021	1,093	1,019	1,029	1,021	1,026	1,013
1978	1,019	1,088	1,016	1,034	1,019	1,030	1,013
1979	1,021	1,092	1,018	1,035	1,021	1,037	1,013
1980	1,026	1,098	1,024	1,035	1,026	1,022	1,013
1981	1,027	1,103	1,025	1,035	1,027	1,014	1,011
1982	1,028	1,107	1,026	1,036	1,028	1,018	1,011
1983	1,031	1,115	1,031	1,030	1,031	1,024	1,010
1984	1,031	1,109	1,030	1,035	1,031	1,005	1,010
1985	1,032	1,112	1,031	1,038	1,032	1,002	1,011
1986	1,030	1,110	1,029	1,034	1,030	997	1,008
1987	1,031	1,112	1,031	1,032	1,031	999	1,011
1988	1,029	1,109	1,029	1,028	1,029	1,002	1,018
1989	1,031	1,107	1,031	1,030	1,031	1,004	1,019
1990	1,031	1,105	1,030	1,034	1,031	1,012	1,018
1991	1,030	1,108	1,031	1,024	1,030	1,014	1,022
1992	1,030	1,110	1,031	1,022	1,030	1,011	1,018
1993	1,027	1,106	1,028	1,022	1,027	1,020	1,016
1994	1,028	1,105	1,029	1,022	1,028	1,022	1,011
1995	1,027	1,106	1,027	1,025	1,027	1,021	1,011
1996	1,027	1,109	1,027	1,024	1,027	1,022	1,011
1997	1,026	1,107	1,027	1,019	1,026	1,023	1,011
1998	1,031	1,110	1,033	1,022	1,031	1,023	1,011
1999 ^a	1,031	1,110	1,033	1,022	1,031	1,023	1,011
2000 ^a	1,031	1,110	1,033	1,022	1,031	1,023	1,011

^a Preliminary.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A6.

Table A5. Approximate Heat Content of Coal and Coal Coke
(Million Btu per Short Ton)

	Coal									Coal Coke	
	Production	Consumption						Imports	Exports	Imports and Exports	
		End-Use Sectors				Electric Power Sector					Total
		Residential and Commercial	Industrial		Electric Utilities	Other Power Producers ^b					
			Coke Plants	Other ^a							
1973	23.376	22.831	26.780	22.586	22.246	NA	23.057	25.000	26.596	24.800	
1974	23.072	22.479	26.778	22.419	21.781	NA	22.677	25.000	26.700	24.800	
1975	22.897	22.261	26.782	22.436	21.642	NA	22.506	25.000	26.562	24.800	
1976	22.855	22.774	26.781	22.530	21.679	NA	22.498	25.000	26.601	24.800	
1977	22.597	22.919	26.787	22.322	21.508	NA	22.265	25.000	26.548	24.800	
1978	22.248	22.466	26.789	22.207	21.275	NA	22.017	25.000	26.478	24.800	
1979	22.454	22.242	26.788	22.452	21.364	NA	22.100	25.000	26.548	24.800	
1980	22.415	22.543	26.790	22.690	21.295	NA	21.947	25.000	26.384	24.800	
1981	22.308	22.474	26.794	22.585	21.085	NA	21.713	25.000	26.160	24.800	
1982	22.239	22.695	26.797	22.712	21.194	NA	21.674	25.000	26.223	24.800	
1983	22.052	22.775	26.798	22.691	21.133	NA	21.576	25.000	26.291	24.800	
1984	22.010	22.844	26.799	22.543	21.101	NA	21.573	25.000	26.402	24.800	
1985	21.870	22.646	26.798	22.020	20.959	NA	21.366	25.000	26.307	24.800	
1986	21.913	22.947	26.798	22.198	21.084	NA	21.462	25.000	26.292	24.800	
1987	21.922	23.404	26.799	22.381	21.136	NA	21.517	25.000	26.291	24.800	
1988	21.823	23.571	26.799	22.360	20.900	NA	21.328	25.000	26.299	24.800	
1989	21.765	23.650	26.800	22.347	20.848	NA	21.272	25.000	26.160	24.800	
1990	21.822	23.137	26.799	22.457	20.929	NA	21.331	25.000	26.202	24.800	
1991	21.681	23.114	26.799	22.460	20.755	NA	21.146	25.000	26.188	24.800	
1992	21.682	23.105	26.799	22.250	20.787	18.928	21.107	25.000	26.161	24.800	
1993	21.418	22.994	26.800	22.123	20.639	18.995	20.947	25.000	26.335	24.800	
1994	21.394	23.112	26.800	22.068	20.673	19.450	20.978	25.000	26.329	24.800	
1995	21.326	23.118	26.800	21.950	20.495	19.417	20.814	25.000	26.180	24.800	
1996	21.322	23.011	26.800	22.105	20.525	19.391	20.824	25.000	26.174	24.800	
1997	21.296	22.494	26.800	22.172	20.548	19.596	20.835	25.000	26.251	24.800	
1998	21.224	22.783	26.800	22.104	20.479	20.143	20.760	25.000	26.243	24.800	
1999	21.224	22.783	26.800	22.104	20.479	20.143	20.760	25.000	26.243	24.800	
2000 ^c	21.224	22.783	26.800	22.104	20.479	20.143	20.760	25.000	26.243	24.800	

^a Includes transportation.

^b Nonutility wholesale producers of electricity, and nonutility cogeneration plants that are not included in the end-use sectors.

^c Preliminary.

Source: See "Thermal Conversion Factor Source Documentation," which follows Table A6.

Table A6. Approximate Heat Rates for Electricity
(Btu per Kilowatthour)

	Electricity Generation			Electricity Consumption
	Fossil-Fueled Steam-Electric Plants ^a	Nuclear Steam-Electric Plants	Geothermal Energy Plants ^b	
1973	10,389	10,903	21,674	3,412
1974	10,442	11,161	21,674	3,412
1975	10,406	11,013	21,611	3,412
1976	10,373	11,047	21,611	3,412
1977	10,435	10,769	21,611	3,412
1978	10,361	10,941	21,611	3,412
1979	10,353	10,879	21,545	3,412
1980	10,388	10,908	21,639	3,412
1981	10,453	11,030	21,639	3,412
1982	10,454	11,073	21,629	3,412
1983	10,520	10,905	21,290	3,412
1984	10,440	10,843	21,303	3,412
1985	10,447	10,813	21,263	3,412
1986	10,446	10,799	21,263	3,412
1987	10,419	10,776	21,263	3,412
1988	10,324	10,743	21,096	3,412
1989	10,432	10,724	21,096	3,412
1990	10,402	10,680	21,096	3,412
1991	10,436	10,740	20,997	3,412
1992	10,342	10,678	20,914	3,412
1993	10,309	10,682	20,914	3,412
1994	10,316	10,676	20,914	3,412
1995	10,312	10,658	20,914	3,412
1996	10,340	10,623	20,960	3,412
1997	10,357	10,623	20,960	3,412
1998	10,346	10,623	21,017	3,412
1999	10,346	10,623	21,017	3,412
2000 ^c	10,346	10,623	21,017	3,412

^a Used as the thermal conversion factor for hydroelectric power generation, and for wood and waste, wind, photovoltaic, and solar thermal energy consumed at electric utilities.

^b Used as the thermal conversion factor for geothermal energy consumed at electric utilities.

^c Preliminary.

Source: See "Thermal Conversion Factor Source Documentation," which follows this table.

Thermal Conversion Factor Source Documentation

Approximate Heat Content of Petroleum and Natural Gas Plant Liquids

Asphalt. The Energy Information Administration (EIA) adopted the thermal conversion factor of 6.636 million British thermal units (Btu) per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Aviation Gasoline. EIA adopted the Bureau of Mines thermal conversion factor of 5.048 million Btu per barrel for "Gasoline, Aviation" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

Butane. EIA adopted the Bureau of Mines thermal conversion factor of 4.326 million Btu per barrel in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Butane-Propane Mixture. EIA adopted the Bureau of Mines calculation of 4.130 million Btu per barrel based on an assumed mixture of 60 percent butane and 40 percent propane. See **Butane** and **Propane**.

Crude Oil, Exports. Assumed by EIA to be 5.800 million Btu per barrel or equal to the thermal conversion factor for crude oil produced in the United States. See **Crude Oil and Lease Condensate, Production**.

Crude Oil, Imports. Calculated annually by EIA by weighting the thermal conversion factor of each type of crude oil imported by the quantity imported. Thermal conversion factors for each type were calculated on a foreign country basis through 1996, by determining the average American Petroleum Institute (API) gravity of crude imported from each foreign country from Form ERA-60 in 1977, or for 1997 and later, by determining the weighted average API gravity from the Form EIA-814, and converting average API gravity to average Btu content by using National Bureau of Standards, Miscellaneous Publication No. 97, *Thermal Properties of Petroleum Products*, 1933.

Crude Oil and Lease Condensate, Production. EIA adopted the thermal conversion factor of 5.800 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Crude Oil and Petroleum Products, Exports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product exported and crude oil exported weighted by the quantity of each petroleum product and crude oil exported. See **Crude Oil, Exports** and **Petroleum Products, Exports**.

Crude Oil and Petroleum Products, Imports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product and each type of crude oil imported weighted by the quantity of each petroleum product and each type of crude oil imported. See **Crude Oil, Imports** and **Petroleum Products, Imports**.

Distillate Fuel Oil. EIA adopted the Bureau of Mines thermal conversion factor of 5.825 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Value of Various Fuels, Adopted January 3, 1950."

Ethane. EIA adopted the Bureau of Mines thermal conversion factor of 3.082 million Btu per barrel in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Ethane-Propane Mixture. EIA calculated 3.308 million Btu per barrel based on an assumed mixture of 70 percent ethane and 30 percent propane. See **Ethane** and **Propane**.

Isobutane. EIA adopted the Bureau of Mines thermal conversion factor of 3.974 million Btu per barrel in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Jet Fuel, Kerosene Type. EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel for "Jet Fuel, Commercial" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

Jet Fuel, Naphtha Type. EIA adopted the Bureau of Mines thermal conversion factor of 5.355 million Btu per barrel for "Jet Fuel, Military" as published by the Texas Eastern Transmission Corporation in Appendix V of *Competition and Growth in American Energy Markets 1947-1985*, a 1968 release of historical and projected statistics.

Kerosene. EIA adopted the Bureau of Mines thermal conversion factor of 5.670 million Btu per barrel as reported in a Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Liquefied Petroleum Gases (LPG) Consumption. Calculated annually by EIA as the average of the thermal conversion factors of each liquefied petroleum gas consumed, weighted by the quantity of each liquefied petroleum gas consumed.

Lubricants. EIA adopted the thermal conversion factor of 6.065 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Miscellaneous Products. EIA adopted the thermal conversion factor of 5.796 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Motor Gasoline. EIA adopted the Bureau of Mines thermal conversion factor of 5.253 million Btu per barrel for "Gasoline, Motor Fuel" by the Texas Eastern Transmission Corporation in Appendix V of *Competition*

tion and Growth in American Energy Markets 1947-1985, a 1968 release of historical and projected statistics. Conversion factors for reformulated and oxygenated motor gasolines are calculated by EIA based on data published in the Environmental Protection Agency, Office of Mobile Sources, National Vehicle and Fuel Emissions Laboratory report EPA 420-F-95-003 *Fuel Economy Impact Analysis of Reformulated Gasoline*. Both of the factors are currently 5.150 million Btu per barrel.

Natural Gas Plant Liquids, Production. Calculated annually by EIA as the average of the thermal conversion factors of each natural gas plant liquid produced weighted by the quantity of each natural gas plant liquid produced.

Natural Gasoline. EIA adopted the thermal conversion factor of 4.620 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Pentanes Plus. EIA assumed the thermal conversion factor to be 4.620 million Btu per barrel or equal to that for natural gasoline. See **Natural Gasoline**.

Petrochemical Feedstocks, Naphtha Less Than 401 Degrees Fahrenheit. Assumed by EIA to be 5.248 million Btu per barrel, equal to the thermal conversion factor for special naphthas. See **Special Naphthas**.

Petrochemical Feedstocks, Oils Equal to or Greater Than 401 Degrees Fahrenheit. Assumed by EIA to be 5.825 million Btu per barrel, equal to the thermal conversion factor for distillate fuel oil. See **Distillate Fuel Oil**.

Petrochemical Feedstocks, Still Gas. Assumed by EIA to be 6.000 million Btu per barrel, equal to the thermal conversion factor for still gas. See **Still Gas**.

Petroleum Coke. EIA adopted the thermal conversion factor of 6.024 million Btu per barrel as reported in Btu per short ton in the Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Value of Various Fuels, Adopted January 3, 1950." The Bureau of Mines calculated this factor by dividing 30.120 million Btu per short ton, as given in the referenced Bureau of Mines internal memorandum, by 5.0 barrels per short ton, as given in the Bureau of Mines Form 6-1300-M and successor EIA forms.

Petroleum Products, Total Consumption. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed, weighted by the quantity of each petroleum product consumed.

Petroleum Products, Consumption by Electric Utilities. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed at electric utilities, weighted by the quantity of each petroleum product consumed at electric utilities. The quantity of petroleum consumed is estimated in the State Energy Data System as documented in the *State Energy Data Report*.

Petroleum Products, Consumption by Industrial Users. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products

consumed in the industrial sector, weighted by the estimated quantity of each petroleum product consumed in the industrial sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in the *State Energy Data Report*.

Petroleum Products, Consumption by Residential and Commercial Users. Calculated annually by EIA as the average of the thermal conversion factors for all petroleum products consumed by the residential and commercial sector, weighted by the estimated quantity of each petroleum product consumed in the residential and commercial sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in the *State Energy Data Report*.

Petroleum Products, Consumption by Transportation Users. Calculated annually by EIA as the average of the thermal conversion factor for all petroleum products consumed in the transportation sector, weighted by the estimated quantity of each petroleum product consumed in the transportation sector. The quantity of petroleum products consumed is estimated in the State Energy Data System as documented in the *State Energy Data Report*.

Petroleum Products, Exports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product, weighted by the quantity of each petroleum product exported.

Petroleum Products, Imports. Calculated annually by EIA as the average of the thermal conversion factors for each petroleum product imported, weighted by the quantity of each petroleum product imported.

Plant Condensate. Estimated to be 5.418 million Btu per barrel by EIA from data provided by McClanahan Consultants, Inc., Houston, Texas.

Propane. EIA adopted the Bureau of Mines thermal conversion factor of 3.836 million Btu per barrel in the *California Oil World and Petroleum Industry*, First Issue, April 1942.

Residual Fuel Oil. EIA adopted the thermal conversion factor of 6.287 million Btu per barrel as reported in the Bureau of Mines internal memorandum, "Bureau of Mines Standard Average Heating Values of Various Fuels, Adopted January 3, 1950."

Road Oil. EIA adopted the Bureau of Mines thermal conversion factor of 6.636 million Btu per barrel, which was assumed to be equal to that of asphalt (see **Asphalt**) and was first published by the Bureau of Mines in the *Petroleum Statement, Annual, 1970*.

Special Naphthas. EIA adopted the Bureau of Mines thermal conversion factor of 5.248 million Btu per barrel, which was assumed to be equal to that of total gasoline (aviation and motor) factor and was first published in the *Petroleum Statement, Annual, 1970*.

Still Gas. EIA adopted the Bureau of Mines estimated thermal conversion factor of 6.000 million Btu per barrel and first published in the *Petroleum Statement, Annual, 1970*.

Unfinished Oils. EIA assumed the thermal conversion factor to be 5.825 million Btu per barrel or equal to that for distillate fuel oil (see **Distillate Fuel Oil**) and first published in the *Annual Report to Congress, Volume 3, 1977*.

Unfractionated Stream. EIA assumed the thermal conversion factor to be 5.418 million Btu per barrel or equal to that for plant condensate (see **Plant Condensate**) and first published in the *Annual Report to Congress, Volume 2, 1981*.

Waxes. EIA adopted the thermal conversion factor of 5.537 million Btu per barrel as estimated by the Bureau of Mines and first published in the *Petroleum Statement, Annual, 1956*.

Approximate Heat Content of Natural Gas

Natural Gas, Total Consumption. 1973-1979: EIA adopted the thermal conversion factor calculated annually by the American Gas Association (AGA) and published in *Gas Facts*, an AGA annual publication. 1980 forward: Calculated annually by EIA by dividing the total heat content of natural gas consumed by the total quantity of natural gas consumed. The heat content and quantity consumed are from Form EIA-176. Published sources are: 1980-1989: EIA, *Natural Gas Annual 1992, Volume 2, Table 15*. 1990-1992: EIA, *Natural Gas Annual 1992, Volume 2, Table 16*. 1993 forward: 1992 value used as an estimate.

Natural Gas, Consumption by Electric Utilities. Calculated annually by EIA by dividing the total heat content of natural gas received at electric utilities by the total quantity received at electric utilities. The heat contents and receipts are from Form FERC-423 and predecessor forms.

Natural Gas, Consumption by Sectors Other Than Electric Utilities. Calculated annually by EIA by dividing the heat content of all natural gas consumed less the heat content of natural gas consumed at electric utilities by the quantity of all natural gas consumed less the quantity of natural gas consumed at electric utilities. Data are from Forms EIA-176, FERC-423, EIA-759, and predecessor forms.

Natural Gas, Exports. Calculated annually by EIA by dividing the heat content of exported natural gas by the quantity of natural gas exported, both reported on Form FPC-14.

Natural Gas, Imports. Calculated annually by EIA by dividing the heat content of imported natural gas by the quantity of natural gas imported, both reported on Form FPC-14.

Natural Gas Production, Dry. Assumed by EIA to be equal to the thermal conversion factor for the consumption of dry natural gas. See **Natural Gas Total Consumption**.

Natural Gas Production, Marketed (Wet). Calculated annually by EIA by adding the heat content of dry natural gas production and the total heat content of natural gas plant liquids production and dividing this

sum by the total quantity of marketed (wet) natural gas production.

Approximate Heat Content of Coal and Coal Coke

Coal, Total Consumption. Calculated annually by EIA by dividing the sum of the heat content of coal (including anthracite culm and waste coal) consumption by the total tonnage.

Coal, Consumption by Electric Utilities. Calculated annually by EIA by dividing the sum of the heat content of coal (including anthracite culm and waste coal) received at electric utilities by the sum of the tonnage received.

Coal, Consumption by Other Power Producers. Calculated annually by dividing the total heat content of coal (including anthracite culm and waste coal) consumed by other power producers by their total consumption tonnage.

Coal, Consumption by the Electric Power Sector. Calculated annually by dividing the total heat content of coal (including anthracite culm and waste coal) by total consumption tonnage of the electric power sector.

Coal, Consumption by End-Use Sectors. Calculated annually by EIA by dividing the sum of the heat content of coal (including anthracite culm and waste coal) consumed by the end-use sectors by the sum of the total tonnage.

Coal, Exports. Calculated annually by EIA by dividing the sum of the heat content of coal exported by the sum of the total tonnage.

Coal, Imports. Calculated annually by EIA by dividing the sum of the heat content of coal imported by the sum of the total tonnage.

Coal, Production. Calculated annually by EIA by dividing the sum of the total heat content of coal (including some anthracite culm) produced by the sum of the total tonnage.

Coal Coke, Imports and Exports. EIA adopted the Bureau of Mines estimate of 24.800 million Btu per short ton.

Approximate Heat Rates for Electricity

Fossil-Fueled Steam-Electric Plant Generation. There is no generally accepted practice for measuring the thermal conversion rates for power plants that generate electricity from hydroelectric, wood and waste, wind, photovoltaic, or solar thermal energy sources. Therefore, EIA uses data from Form EIA-767 to calculate a rate factor that is equal to the prevailing annual average heat rate factor for fossil-fueled steam-electric power plants in the United States. By using that factor, it is possible to evaluate fossil fuel requirements for replacing those sources during periods of interruption such as droughts. The heat content of a kilowatthour

of electricity produced, regardless of the generation process, is 3,412 Btu per kilowatthour. 1973-1991: The weighted annual average heat rate for fossil-fueled steam-electric power plants in the United States, as published by EIA in *Electric Plant Cost and Power Production Expenses 1991*, Table 9. 1992 forward: Unpublished factors calculated on the basis of data from Form EIA-767.

Geothermal Energy Plant Generation. 1973-1981: Calculated annually by EIA by weighting the annual average heat rates of operating geothermal units by the installed nameplate capacities as reported on Form FPC-12. 1982 forward: Estimated annually by EIA on the basis of an informal survey of relevant plants.

Nuclear Steam-Electric Plant Generation. 1973-1991: Calculated annually by EIA by dividing the total heat content consumed in nuclear generating units by the

total (net) electricity generated by nuclear generating units. The heat content and electricity generation are reported on Form FERC-1, "Annual Report of Major Electric Utilities, Licenses, and Others;" Form EIA-412, "Annual Report of Public Electric Utilities;" and predecessor forms. The factors, beginning with 1982 data, are published in the following EIA reports—1982: *Historical Plant Cost and Annual Production Expenses for Selected Electric Plants 1982*, page 215. 1983-1991: *Electric Plant Cost and Power Production Expenses 1991*, Table 13. 1992 forward: Calculated annually by EIA by dividing the total heat content of the steam leaving the nuclear generating units to generate electricity by the total (net) electricity generated by nuclear generating units. The heat content and electricity generation data are reported in Nuclear Regulatory Commission, *Licensed Operating Reactors—Status Summary Report*.

Appendix B. Metric and Other Physical Conversion Factors

Data presented in the *Monthly Energy Review* and in other Energy Information Administration publications are expressed predominately in units that historically have been used in the United States, such as British thermal units, barrels, cubic feet, and short tons. However, because U.S. commerce involves other nations, most of which use metric units of measure, the U.S. Government is committed to the transition to the metric system, as stated in the Metric Conversion Act of 1975 (Public Law 94-168), amended by the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418), and Executive Order 12770 of July 25, 1991.

The metric conversion factors presented in Table B1 can be used to calculate the metric-unit equivalents of values expressed in U.S. customary units. For example, 500 short tons are the equivalent of 453.6 metric tons (500 short tons x 0.9071847 metric tons/short ton = 453.6 metric tons).

In the metric system of weights and measures, the names of multiples and subdivisions of any unit may be derived by combining the name of the unit with prefixes, such as deka, hecto, and kilo, meaning, respectively, 10, 100, 1,000, and deci, centi, and milli, meaning, respectively, one-tenth, one-hundredth, and one-thousandth. Common metric prefixes can be found in Table B2.

The conversion factors presented in Table B3 can be used to calculate equivalents in various physical units commonly used in energy analyses. For example, 10 barrels are the equivalent of 420 U.S. gallons (10 barrels x 42 gallons/barrel = 420 gallons).

Table B1. Metric Conversion Factors

Type of Unit	U.S. Unit	multiplied by	Conversion Factor	equals	Metric Unit
Mass	short tons (2,000 lb)	x	0.907 184 7	=	metric tons (t)
	long tons	x	1.016 047	=	metric tons (t)
	pounds (lb)	x	.453 592 37 ^a	=	kilograms (kg)
	pounds uranium oxide (lb U ₃ O ₈)	x	0.384 647 ^b	=	kilograms uranium (kgU)
	ounces, avoirdupois (avdp oz)	x	28.349 52	=	grams (g)
Volume	barrels of oil (bbl)	x	0.158 987 3	=	cubic meters (m ³)
	cubic yards (yd ³)	x	0.764 555	=	cubic meters (m ³)
	cubic feet (ft ³)	x	0.028 316 85	=	cubic meters (m ³)
	U.S. gallons (gal)	x	3.785 412	=	liters (L)
	ounces, fluid (fl oz)	x	29.573 53	=	milliliters (mL)
	cubic inches (in ³)	x	16.387 06	=	milliliters (mL)
Length	miles (mi)	x	1.609 344 ^a	=	kilometers (km)
	yards (yd)	x	0.914 4 ^a	=	meters (m)
	feet (ft)	x	0.304 8 ^a	=	meters (m)
	inches (in)	x	2.54 ^b	=	centimeters (cm)
Area	acres	x	0.404 69	=	hectares (ha)
	square miles (mi ²)	x	2.589 988	=	square kilometers (km ²)
	square yards (yd ²)	x	0.836 127 4	=	square meters (m ²)
	square feet (ft ²)	x	0.092 903 04 ^a	=	square meters (m ²)
	square inches (in ²)	x	6.451 6 ^b	=	square centimeters (cm ²)
Temperature	degrees Fahrenheit (°F)	x	5/9 (after subtracting 32) ^{a,c}	=	degrees Celsius (°C)
Energy	British thermal units (Btu)	x	1,055.055 852 62 ^{a,d}	=	joules (J)
	calories (cal)	x	4.186 8 ^a	=	joules (J)
	Kilowatthours (kWh)	x	3.6 ^a	=	megajoules (MJ)

^aExact conversion.

^bCalculated by the Energy Information Administration.

^cTo convert degrees Celsius (°C) to degrees Fahrenheit (°F) exactly, multiply by 9/5, then add 32.

^dThe Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.

Notes: • Spaces have been inserted after every third digit to the right of the decimal for ease of reading. • Most metric units belong to the International System of Units (SI), and the liter, hectare, and metric ton are accepted for use with the SI units. For more information about the SI units, contact Dr. Barry Taylor at Building 221, Room B610, National Institute of Standards and Technology, Gaithersburg, MD 20899, or on telephone number 301-975-4220.

Sources: • General Services Administration, Federal Standard 376B, *Preferred Metric Units for General Use by the Federal Government* (Washington, DC, January 27, 1993), pp. 9-11, 13, and 16. • National Institute of Standards and Technology, Special Publications 330, 811, and 814. • American National Standards Institute/Institute of Electrical and Electronic Engineers, ANSI/IEEE Std 268-1992, pp. 28 and 29.

Table B2. Metric Prefixes

Unit Multiple	Prefix	Symbol	Unit Subdivision	Prefix	Symbol
10 ¹	deka	da	10 ⁻¹	deci	d
10 ²	hecto	h	10 ⁻²	centi	c
10 ³	kilo	k	10 ⁻³	milli	m
10 ⁶	mega	M	10 ⁻⁶	micro	
10 ⁹	giga	G	10 ⁻⁹	nano	n
10 ¹²	tera	T	10 ⁻¹²	pico	p
10 ¹⁵	peta	P	10 ⁻¹⁵	femto	f
10 ¹⁸	exa	E	10 ⁻¹⁸	atto	a
10 ²¹	zetta	Z	10 ⁻²¹	zepto	z
10 ²⁴	yotta	Y	10 ⁻²⁴	yocto	y

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *The International System of Units (SI)*, NIST Special Publication 330, 1991 Edition (Washington, DC, August 1991), p.10.

Table B3. Other Physical Conversion Factors

Energy Source	Original Unit	<i>multiplied by</i>	Conversion Factor	<i>equals</i>	Final Unit
Petroleum	barrels (bbl)	x	42 ^a	=	U.S. gallons (gal)
Coal	short tons	x	2,000 ^a	=	pounds (lb)
	long tons	x	2,240 ^a	=	pounds (lb)
	metric tons (t)	x	1,000 ^a	=	kilograms (kg)
Wood	cords (cd)	x	1.25 ^b	=	shorts tons
	cords (cd)	x	128 ^a	=	cubic feet (ft ³)

^aExact conversion.

^bCalculated by the Energy Information Administration.

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, NIST Handbook 44, 1994 Edition (Washington, DC, October 1993), pp. B-10, C-17 and C-21.

Appendix C. Carbon Dioxide Emission Factors for Coal

Table C1 presents U.S. average carbon dioxide emission factors for coal by sector. The factors measure the emissions produced during the combustion of coal and were derived by the Energy Information Administration (EIA) from 5,426 sample analyses in EIA's Coal Analysis File. The factors are ratios of the carbon dioxide emitted to the heat content of the coal burned, assuming complete combustion. Factors vary according to the rank and geographic origin of the coal. Sectoral factors reflect the rank and origin of the coal consumed in the sector.

Factors differ among sectors and within a sector over time for several reasons:

1. A higher average emission factor in the residential and commercial sector can be attributed to the steady consumption of bituminous coal and anthracite (presumably for home heating).

2. Virtually all of the coal consumed by coke plants comes from only a few States in the Appalachian Coal Basin (West Virginia, Virginia, and eastern Kentucky). Hence, the emission factors for this sector have remained fairly constant.

3. Other industrial users of coal (not coke plants) increased consumption of low-rank, high-emission western coals, which has contributed to a rise in their average emission factor.

4. Electric utilities, which account for most U.S. coal consumption, have shifted over time away from high-rank, low-emission bituminous coal to low-rank, high-emission subbituminous coal and lignite as reflected in a gradually rising weighted-average carbon dioxide emission factor.

Table C1. Average Carbon Dioxide Emission Factors for Coal by Sector
(Pounds of Carbon Dioxide per Million Btu)

Year	Residential and Commercial	Industrial		Electric Utilities	U.S. Average ^b
		Coke Plants ^a	Other Coal		
1980	210.6	205.8	205.9	206.7	206.5
1981	212.0	205.8	205.9	206.9	206.7
1982	210.4	205.7	206.0	207.0	206.9
1983	209.2	205.5	205.9	207.1	207.0
1984	209.5	205.6	206.2	207.1	207.0
1985	209.3	205.6	206.4	207.3	207.1
1986	209.2	205.4	206.5	207.3	207.1
1987	209.4	205.2	206.4	207.3	207.2
1988	209.1	205.3	206.4	207.6	207.3
1989	209.7	205.3	206.6	207.5	207.3
1990	209.5	206.2	206.8	207.6	207.4
1991	210.2	206.2	206.9	207.7	207.5
1992	211.2	206.2	207.1	207.7	207.6
1993	209.9	206.2	207.0	207.8	207.7
1994	209.8	206.3	207.2	207.9	207.8
1995	210.2	206.4	207.2	208.1	207.9
1996	209.5	206.5	207.0	208.1	208.0
1997	210.2	206.6	207.2	208.2	208.0

^aNo allowances have been made for carbon retained in non-energy coal chemical byproducts from the carbonization process.

^bWeighted average. The weights used are consumption values by sector.

Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels.

Appendix D. List of Features

The following is a complete list of features that have appeared in the *Monthly Energy Review* since the first issue was published in October 1974. There are several categories of features on the list: “Energy Plugs” are 1-page descriptions of recently released EIA products. “Articles” cover a wide range of energy-related subjects in depth; “Highlights” summarize the most important information presented in the subject Energy

Information Administration (EIA) report; “Energy Previews” provide brief overviews of EIA preliminary energy data on a given topic; “EIA Data News” items present information on recent changes in the scope, design, methodology, and findings of EIA’s energy surveys and databases; and “Energy Snapshots” use graphics to set off key data from EIA survey reports.

Feature	Cover Date
2000	
Energy Plug: <i>Inventory of Nonutility Electric Power Plants in the United States 1998</i>	January 2000
Energy Plug: <i>The Changing Structure of the Electric Power Industry 1999: Mergers and Other Corporate Combinations</i>	January 2000
Energy Plug: <i>International Energy Annual 1998</i>	February 2000
Energy Plug: <i>Performance Profiles of Major Energy Producers 1998</i>	February 2000
Energy Plug: OPEC Revenues Fact Sheet	March 2000
Energy Plug: Country Analysis Brief: Iran	March 2000
Energy Plug: <i>International Energy Outlook 2000</i>	April 2000
Energy Plug: <i>Outlook for Biomass Ethanol Production and Demand</i>	April 2000
Energy Plug: <i>Summer 2000 Motor Gasoline Outlook</i>	May 2000
Energy Plug: <i>State Energy Price and Expenditure Report 1997</i>	June 2000
Energy Plug: <i>Energy Consumption and Renewable Energy Development Potential on Indian Lands</i>	June 2000
1999	
Energy Plug: <i>Performance Profiles of Major Energy Producers 1997</i>	January 1999
Energy Plug: <i>State Energy Data Report 1996</i>	February 1999
Energy Plug: <i>State Electricity Profiles</i>	March 1999
Energy Plug: <i>International Energy Annual 1997</i>	April 1999
Energy Plug: <i>International Energy Outlook 1999</i>	April 1999
Energy Plug: <i>Natural Gas 1998: Issues and Trends</i>	May 1999
Energy Plug: <i>Electric Power Annual 1998, Volume I</i>	June 1999
Energy Plug: <i>Annual Energy Review 1998</i>	July 1999
Energy Plug: <i>Energy in the Americas</i>	August 1999
Energy Plug: <i>State Energy Data Report 1997</i>	September 1999
Energy Plug: <i>The U.S. Coal Industry in the 1990s: Low Prices and Record Production</i>	September 1999
Energy Plug: <i>Issues in Midterm Analysis and Forecasting 1999</i>	October 1999
Energy Plug: <i>1999-2000 Winter Fuels Outlook</i>	November 1999
Energy Plug: <i>Emissions of Greenhouse Gases in the United States 1998</i>	November 1999
Energy Plug: <i>Annual Energy Outlook 2000</i>	December 1999
Energy Plug: <i>Energy in Africa</i>	December 1999
1998	
Energy Plug: <i>Performance Profiles of Major Energy Producers 1996</i>	January 1998
Energy Plug: <i>International Energy Annual 1996</i>	February 1998
Energy Plug: <i>Assessment of Summer 1997 Motor Gasoline Price Increase</i>	April 1998
Energy Plug: <i>Deliverability on the Interstate Natural Gas Pipeline System</i>	May 1998
Energy Plug: <i>The Changing Structure of the Electric Power Industry: Selected Issues, 1998</i>	June 1998
Energy Plug: <i>Annual Energy Review 1997</i>	July 1998
Energy Plug: <i>State Energy Price and Expenditure Report 1995</i>	August 1998
Energy Plug: <i>A View of the Forest Products Industry From a Wood Energy Perspective</i>	August 1998

1998 (Continued)

Energy Plug: 25 th Anniversary of the 1973 Oil Embargo: Energy Trends Since the First Major U.S. Energy Crisis	September 1998
Energy Plug: Energy Education Resources: Kindergarten Through 12 th Grade	September 1998
Energy Plug: <i>Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity</i>	October 1998
Energy Plug: <i>Emissions of Greenhouse Gases in the United States 1997</i>	October 1998
Energy Plug: <i>Wind Energy Developments: Incentives in Selected Countries</i>	November 1998
Energy Plug: <i>Annual Energy Outlook 1999</i>	November 1998

1997

Energy Plug: <i>Annual Energy Outlook 1997</i>	January 1997
Energy Plug: <i>The Changing Structure of the Electric Power Industry: An Update</i>	January 1997
Energy Plug: <i>Performance Profiles of Major Energy Producers 1995</i>	January 1997
Energy Plug: <i>The Effects of Title IV of the Clean Air Act Amendments of 1990 on Electric Utilities: An Update</i>	March 1997
Energy Plug: <i>International Energy Outlook 1997</i>	April 1997
Energy Plug: <i>Restructuring Energy Industries: Lessons From Natural Gas</i>	May 1997
Energy Plug: <i>An Analysis of U.S. Propane Markets: Winter 1996-97</i>	June 1997
Energy Plug: <i>State Energy Price and Expenditure Report 1994</i>	June 1997
Energy Plug: <i>Annual Energy Review 1996</i>	July 1997
Energy Plug: <i>Motor Gasoline Assessment 1997</i>	July 1997
Energy Plug: <i>Commercial Buildings Characteristics 1995</i>	July 1997
Energy Plug: <i>Household Vehicles Energy Consumption 1994</i>	August 1997
Energy Plug: <i>Electricity Prices in a Competitive Environment</i>	August 1997
Energy Plug: <i>Petroleum 1996: Issues and Trends</i>	September 1997
Energy Plug: The Intricate Puzzle of Oil and Gas "Reserves Growth"	September 1997
Energy Plug: <i>Emissions of Greenhouse Gases in the United States 1996</i>	October 1997
Energy Plug: <i>Electricity Reform Abroad and U.S. Investment</i>	October 1997
Energy Plug: <i>Annual Energy Outlook 1998</i>	November 1997
Energy Plug: Winter Heating Fuels Assessments	December 1997
Energy Plug: <i>Oil and Gas Resources of the West Siberian Basin, Russia</i>	December 1997

1996

Energy Plug: <i>Renewable Energy Annual 1995</i>	January 1996
Energy Plug: <i>State Energy Price and Expenditure Report 1993</i>	January 1996
Energy Plug: <i>Annual Energy Outlook 1996</i>	February 1996
Energy Plug: <i>Alternatives to Traditional Transportation Fuels 1994, Volume 1</i>	February 1996
Energy Snapshot: Describing Current and Potential Markets for Alternative-Fuel Vehicles	March 1996
Article: Energy Equipment Choices: Fuel Costs and Other Determinants	April 1996
Energy Plug: <i>International Energy Outlook 1996</i>	May 1996
Energy Plug: U.S. Electric Utility Demand-Side Management: Trends and Analysis	May 1996
Energy Plug: Country Analysis Brief: Iraq	June 1996
Energy Plug: <i>Annual Energy Review 1995</i>	July 1996
Energy Plug: <i>Voluntary Reporting of Greenhouse Gases 1995</i>	July 1996
Energy Plug: <i>Residential Lighting: Use and Potential Savings</i>	August 1996
Energy Plug: EIA Electronic Media Meet Customer Needs	August 1996
Energy Plug: <i>Alternatives to Traditional Transportation Fuels, Volume 2: Greenhouse Gas Emissions</i>	September 1996
Energy Plug: <i>State Energy Data Report 1994</i>	October 1996
Energy Plug: <i>Privatization and the Globalization of Energy Markets</i>	October 1996
Energy Plug: <i>Emissions of Greenhouse Gases in the United States 1995</i>	October 1996
Energy Plug: <i>Nuclear Power Generation and Fuel Cycle Report 1996</i>	November 1996
Energy Plug: Country Analysis Brief: Algeria	November 1996
Energy Plug: <i>Denver Clean-City Fleets Survey</i>	November 1996
Energy Plug: <i>Natural Gas 1996: Issues and Trends</i>	December 1996

1995

Highlights: <i>Manufacturing Consumption of Energy 1991</i>	January 1995
Article: U.S. Wind Energy Potential: The Effect of the Proximity of Wind Resources to Transmission Lines	February 1995
EIA Data News: The Response Analysis Survey: Evaluating Manufacturing Energy Consumption Survey Methodology	March 1995
Energy Preview: Electric Utility Fleet Survey 1993, Preliminary Estimates: Assessing the Market for Alternative-Fuel Vehicles	April 1995
Highlights: <i>Commercial Buildings Energy Consumption and Expenditures 1992</i>	April 1995
Article: Measuring Dependence on Imported Oil	August 1995
Energy Preview: Household Energy Consumption and Expenditures 1993, Preliminary Estimates	August 1995
Energy Snapshot: Housing Characteristics 1993	September 1995
Highlights: <i>State Energy Data Report 1993, Consumption Estimates</i>	October 1995
Special Communication: Results of the Monthly Energy Review Features Readership Survey	November 1995
Highlights: <i>Annual Energy Review 1994</i>	November 1995

1995 (Continued)

Energy Preview: Alternative Fuel Providers Fleet Surveys, Preliminary Data	November 1995
Article: Environmental Externalities in Electric Power Markets: Acid Rain, Urban Ozone, and Climate Change	November 1995
Energy Preview: Alternative Fuel Providers Fleet Surveys, Preliminary Data	December 1995

1994

Energy Preview: Commercial Buildings Energy Consumption Survey, Preliminary Estimates, 1992	January 1994
Highlights: <i>Household Vehicles Energy Consumption 1991</i>	February 1994
Highlights: <i>Energy Use and Carbon Emissions: Some International Comparisons</i>	April 1994
Highlights: <i>Commercial Buildings Characteristics 1992</i>	June 1994
Article: Demand, Supply, and Price Outlook for Reformulated Motor Gasoline 1995	July 1994
Article: Commercial Nuclear Electric Power in the United States: Problems and Prospects	August 1994
Article: The Impact of Flow Control and Tax Reform on Ownership and Growth in the U.S.	August 1994
Highlights: <i>Reducing Home Heating and Cooling Costs</i>	September 1994
Energy Preview: Commercial Buildings Energy Consumption and Expenditures 1992, Preliminary Estimates	September 1994
Article: Carbon Dioxide Emission Factors for Coal: A Summary	
Waste-to-Energy Industry	September 1994
EIA Data News: Data Collection on Alternative-Fuel Vehicles	October 1994
Highlights: <i>Energy End-Use Intensities in Commercial Buildings</i>	October 1994
Article: Change in Method for Estimating Fuel Economy for the Residential Transportation	
Energy Consumption Survey	October 1994
Article: Comparability of Supply- and Consumption-Derived Estimates of Manufacturing Energy Consumption	October 1994
Energy Preview: Housing Characteristics 1993, Selected Preliminary Estimates	November 1994
Energy Preview: Propane-Provider Fleet Survey 1993, Preliminary Estimates	November 1994
Energy Preview: Atlanta Private Fleet Survey 1994, Preliminary Estimates	December 1994

1993

Energy Preview: Residential Transportation Energy Consumption Survey, Preliminary Estimates, 1991	January 1993
EIA Data News: Natural Gas Transported for the Account of Others	February 1993
Highlights: <i>Federal Energy Subsidies: Direct and Indirect Interventions in Energy Markets</i>	July 1993
Highlights: <i>Household Energy Consumption and Expenditures 1990</i>	August 1993
Article: Demand, Supply, and Price Outlook for Low-Sulfur Diesel Fuel	August 1993
Energy Preview: Manufacturing Energy Consumption Survey, Preliminary Estimates, 1991	September 1993
Highlights: <i>Natural Gas 1992: Issues and Trends</i>	September 1993
Highlights: <i>International Energy Outlook 1993</i>	October 1993
Highlights: <i>The Changing Structure of the U.S. Coal Industry: An Update</i>	November 1993
Highlights: <i>Emissions of Greenhouse Gases in the United States 1985-1990</i>	December 1993
Highlights: <i>Assessment of Energy Use in Multibuilding Facilities</i>	December 1993

1992

Energy Preview: Residential Energy Consumption and Expenditures Preliminary Estimates, 1990	April 1992
EIA Data News: Oxygenate Data Collection Begins	May 1992
Highlights: <i>Lighting in Commercial Buildings</i>	June 1992
Article: Demand, Supply, and Price Outlook for Oxygenated Gasoline, Winter 1992-1993	August 1992
EIA Data News: EIA Statistics on Electric Utility Demand-Side Management	September 1992
EIA Data News: EIA Statistics on Nonutility Power Producers	October 1992
EIA Data News: EIA Statistics on Electric Utility Demand-Side Management	November 1992
Article: Energy Efficiency in the Manufacturing Sector	December 1992

1991

Highlights: <i>U.S. Energy Industry Financial Developments, 1990 Fourth Quarter</i>	March 1991
Article: U.S. Wholesale Electricity Transactions	April 1991

1990

Article: Refining Results Highlight Energy Companies' First-Half Profit Performance	June 1990
Highlights: <i>U.S. Oil and Gas Reserves by Year of Field Discovery</i>	August 1990

1989

Article: A Review of Valdez Oil Spill Market Impacts	March 1989
Article: Monthly U.S. Crude Oil Production Estimates	March 1989
Article: Superconductivity and Energy Production and Consumption	May 1989
Highlights: <i>Commercial Buildings Consumption and Expenditures 1986</i>	May 1989
Article: Higher Prices Yield Improved Energy Industry Financial Results	
in the First Half of 1989	June 1989
Article: The Future Structure of the U.S. Commercial Nuclear Power Equipment	
Manufacturing Industry	July 1989
Highlights: <i>Potential Costs of Restricting Chlorofluorocarbon Use</i>	September 1989
Highlights: <i>Manufacturing Energy Consumption Survey: Changes in Energy Efficiency, 1980-1985</i>	October 1989
Highlights: <i>Household Energy Consumption and Expenditures 1987, Part 1: National Data</i>	November 1989
Article: Improved Energy Profits Offset by Refining Results in 1989	December 1989

1988

Article: Measures of Energy Consumption, Expenditures, and Prices	May 1988
Article: The U.S. Energy Industry's Financial Recovery Continued in the First Half of 1988	June 1988
Article: A U.S. Perspective on Condensate	June 1988
Highlights: <i>Characteristics of Commercial Buildings 1986</i>	June 1988
Article: State Energy Severance Taxes, 1972-1987	July 1988
Highlights: <i>Manufacturing Energy Consumption Survey: Consumption of Energy, 1985</i>	September 1988
Highlights: <i>Profiles of Foreign Direct Investment in U.S. Energy 1987</i>	October 1988
Highlights: <i>Manufacturing Energy Consumption Survey: Fuel Switching, 1985</i>	November 1988
Article: Increased Refining Income Led U.S. Energy Industry Financial Recovery in 1988	December 1988

1987

Article: Manufacturing Sector Energy Consumption, 1985 Provisional Estimates	January 1987
Highlights: <i>Consumption and Expenditures, April 1984 Through March 1985, Part 1: National Data</i>	April 1987
Highlights: <i>Consumption and Expenditures, April 1984 Through March 1985, Part 2: Regional Data</i>	May 1987
Article: U.S. Energy Industry Financial Developments, 1987 Second Quarter	June 1987
Article: End-Use Consumption of Residential Energy	July 1987
Highlights: <i>Uranium Industry Annual 1986</i>	September 1987
Highlights: <i>Potential Oil Production from ANWR</i>	October 1987
Highlights: <i>Profiles of Foreign Direct Investment in U.S. Energy 1986</i>	November 1987
Article: The U.S. Energy Industry in 1987: A Slow Recovery	December 1987

1986

Article: State Motor Gasoline Taxes, 1960-1985	March 1986
Article: The Impact of Low Oil Prices on Electric Utility Fuel Choice	June 1986
Article: U.S. Energy Industry Financial Developments, 1986 Second Quarter	June 1986
Highlights: <i>International Energy Annual 1985</i>	September 1986
Article: U.S. Energy Industry Financial Developments, 1986	December 1986

1985

Highlights: <i>Annual Energy Review 1984</i>	January 1985
Highlights: <i>Performance Profiles of Major Energy Producers 1983</i>	February 1985
Article: Estimating Well Completions	March 1985
Highlights: <i>State Energy Price and Expenditure Report 1970-1982</i>	March 1985
Highlights: <i>State Energy Data Report, Consumption Estimates, 1960-1983</i>	April 1985
Highlights: <i>Annual Outlook for U.S. Electric Power 1985</i>	June 1985
Highlights: <i>Short-Term Energy Outlook, Volume 1, October 1985</i>	August 1985
Highlights: Analysis of Growth in Electricity Demand, 1980-1984	August 1985
Highlights: <i>Profiles of Foreign Direct Investment in U.S. Energy 1984</i>	November 1985
Highlights: <i>Performance Profiles of Major Energy Producers 1984</i>	December 1985

1984

Highlights: <i>Annual Energy Review 1983</i>	February 1984
Highlights: <i>Annual Energy Outlook 1983</i>	March 1984
Highlights: <i>State Energy Data Report, Consumption Estimates, 1960-1982</i>	March 1984
Highlights: State Energy Price and Expenditure Report, 1970-1981	May 1984
Highlights: Solar Collector Manufacturing Activity 1983	June 1984
Highlights: <i>International Energy Annual 1983</i>	September 1984
Highlights: <i>Estimates of U.S. Wood Energy Consumption, 1980-1983</i>	September 1984
Highlights: <i>Energy Conservation Indicators 1983 Annual Report</i>	November 1984
Highlights: <i>Annual Energy Outlook 1984</i>	December 1984

1983

Highlights: <i>Residential Energy Consumption Survey: Consumption and Expenditures</i>	January 1983
Highlights: <i>Residential Energy Consumption Survey: Housing Characteristics</i>	February 1983
Article: The Effect of Weather on Energy Use	April 1983
Article: Trends in U.S. Energy Since 1973	May 1983
Article: Data Series on Petroleum Use at Electric Utilities	July 1983
Highlights: <i>Energy Price and Expenditure Data Report, 1970-1980</i>	July 1983
Highlights: <i>Railroad Deregulation: Impact on Coal</i>	August 1983
Highlights: <i>Port Deepening and User Fees: Impact on U.S. Coal Exports</i>	August 1983
Highlights: <i>U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1982 Annual Report</i>	September 1983
Article: Residential Energy Consumption, 1978 Through 1981	September 1983
Article: Exploring for Oil and Gas	November 1983
Article: The Influence of Federal Actions on Petroleum Exploration	December 1983[2]
Article: Aggregate Statistics: Accurate or Misleading?	December 1983[3]

1982

Article: The Interstate and Intrastate Natural Gas Markets	January 1982
Article: Natural Gas Drilling and Production Under the Natural Gas Policy Act	February 1982
Highlights: <i>U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1981 Annual Report</i>	September 1982
Article: Impacts of Financial Constraints on the Electric Utility Industry	October 1982
Highlights: <i>Energy Company Development Patterns in the Postembargo Era</i>	November 1982

1981

Article: Changes in 1981 Petroleum Data Series	May 1981
Article: Information Services of the Energy Information Administration	September 1981
Article: An Overview of Natural Gas Markets	December 1981

1980

Article: The Solar Collector Industry and Solar Energy	February 1980
Article: Trends in the Installation of Energy Using Equipment in New Residential Buildings	March 1980
Article: The Energy Information Administration's Oil and Gas Reserves Program—The First Year's Report	June 1980
Article: Energy From Urban Waste	August 1980
Article: Natural Gas Liquids: Revisions to 1979 Data	October 1980
Article: EIA Weekly Petroleum Data: Data Collection and Methods of Estimation	November 1980
Article: The Department of Energy Disclosure Policy for Individually Identifiable Information Maintained by the Energy Information Administration	December 1980

1979

Article: The Energy Requirements of U.S. Agriculture	July 1979
Article: Three Mile Island—Possible Regulatory Responses and Their Impacts on the Nation's Short-Term Electric Utility Fuel Outlook	October 1979
Article: Reduction in Natural Gas Requirements Due to Fuel Switching	December 1979

1978

Article: Short-Term Petroleum Supply and Demand	May 1978
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1977

Article: Crude Oil Entitlements Program	January 1977
Article: Motor Gasoline Supply and Demand	July 1977

1976

Article: Curtailments of Natural Gas Service	January 1976
Article: Home Heating Conservation Alternatives and the Solar Collector Industry	March 1976
Article: Trends in United States Petroleum Imports	September 1976

1975

Article: Energy Consumption	March 1975
Article: Nuclear Power	April 1975
Article: The Price of Crude Oil	June 1975
Article: U.S. Coal Resources and Reserves	July 1975
Article: Propane—A National Energy Resource	September 1975
Article: Short-Term Energy Supply and Demand Forecasting at FEA	October 1975

Glossary

Anthracite: The highest rank of coal. It is a hard, brittle, and black lustrous coal, often referred to as hard coal, containing a high percentage of fixed carbon and a low percentage of volatile matter. It is used primarily for residential and commercial space heating. The moisture content of fresh-mined anthracite generally is less than 15 percent. The heat content of anthracite ranges from 22 to 28 million Btu per ton on a moist, mineral-matter-free basis. The heat content of anthracite coal consumed in the United States averages 25 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter). Note: Since the 1980s anthracite refuse or mine waste has been used for steam-electric power generation. This fuel typically has a heat content of 15 million Btu per ton or less.

Anthracite Culm: Waste from Pennsylvania anthracite preparation plants, consisting of coarse rock fragments containing as much as 30 percent small-sized coal; sometimes defined as including very fine coal particles called silt. Its heat value ranges from 8 to 17 million Btu per short ton.

Asphalt: A dark-brown-to-black cement-like material containing bitumens as the predominant constituents obtained by petroleum processing. The definition includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts.

ASTM: The American Society for Testing and Materials.

Aviation Gasoline Blending Components: Naphthas that are used for blending or compounding into finished aviation gasoline (e.g., straight-run gasoline, alkylate, and reformate). Excludes oxygenates (alcohols and ethers), butane, and pentanes plus.

Aviation Gasoline, Finished: All special grades of gasoline used in aviation reciprocating engines, as given in ASTM Specification D910 and Military Specification MIL-G-5572. Excludes blending components that will be used in blending or compounding into finished aviation gasoline.

Barrel (petroleum): A unit of volume equal to 42 U.S. gallons.

Base (Cushion) Gas: The volume of gas needed as a permanent inventory to maintain adequate underground storage reservoir pressures and deliverability rates throughout the withdrawal season. All native gas is included in the base gas volume.

Bituminous Coal: A dense, black coal, often with well-defined bands of bright and dull material. Bituminous coal is the most abundant coal in active U.S. mining regions. It is used primarily as fuel in

steam-electric power generation, with substantial quantities also used for heat and power applications in manufacturing and to make coke. Its moisture content usually is less than 20 percent. The heat content of bituminous coal ranges from 21 to 30 million Btu per ton on a moist, mineral-matter-free basis. The heat content of bituminous coal consumed in the United States averages 24 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter).

British Thermal Unit (Btu): The quantity of heat needed to raise the temperature of 1 pound of water by 1° F at or near 39.2° F. See **Heat Content of a Quantity of Fuel, Gross** and **Heat Content of a Quantity of Fuel, Net**.

Bunker Oil: Fuels supplied to ships and aircraft in international transportation, irrespective of the flag of the carrier, consisting primarily of residual, distillate, and jet fuel oils.

Butane: A normally gaseous straight-chain or branched-chain hydrocarbon (C₄H₁₀). It is extracted from natural gas or refinery gas streams. It includes isobutane and normal butane and is designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial butane.

Isobutane: A normally gaseous branched-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of 10.9° F. It is extracted from natural gas or refinery gas streams.

Normal Butane: A normally gaseous straight-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of 31.1° F. It is extracted from natural gas or refinery gas streams.

Butylene: An olefinic hydrocarbon (C₄H₈) recovered from refinery processes.

Capacity Factor: The ratio of the electrical energy produced by a generating unit for a given period of time to the electrical energy that could have been produced at continuous full-power operation during the same period.

Chained Dollars: A measure used to express real prices. Real prices are those that have been adjusted to remove the effect of changes in the purchasing power of the dollar; they usually reflect buying power relative to a reference year. Prior to 1996, real prices were expressed in constant dollars, a measure based on the weights of goods and services in a single year, usually a recent year. In 1996, the U.S. Department of Commerce introduced the chained-dollar measure. The new measure is based on the average weights of goods and services in successive pairs of years. It is "chained" because the second year in each pair, with its weights, becomes the first year of the next pair. The advantage of using the chained-dollar measure is that it is more closely related to any given period and is therefore subject to less distortion over time.

CIF: See **Cost, Insurance, Freight**.

City Gate: A point or measuring station at which a distribution gas utility receives gas from a natural gas pipeline company or transmission system.

Coal: A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material. It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time.

Coal Coke: See **Coke, Coal**.

Coal Rank: The classification of coals according to their degree of progressive alteration from lignite to anthracite. In the U.S. classification, the ranks include lignite, subbituminous coal, bituminous coal, and anthracite, and are based on fixed carbon, volatile matter, heating value, and agglomerating (or caking) properties.

Coal Stocks: Coal quantities that are held in storage for future use and disposition. Note: When coal data are collected for a particular reporting period (month, quarter, or year), coal stocks are commonly measured as of the last day of the period.

Cogenerator: A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, or cooling purposes. See **Nonutility Power Producers**.

Coke, Coal: A solid carbonaceous residue derived from low-ash, low-sulfur bituminous coal from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000° F so that the fixed carbon and residual ash are fused together. Coke is used as a fuel and as a reducing agent in smelting iron ore in a blast furnace. Coke (coal) has a heating value of 24.8 million Btu per ton.

Coke, Petroleum: A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke or catalyst coke. The conversion is 5 barrels (42 U.S. gallons each) per short ton. Coke (petroleum) has a heating value of 6.024 million Btu per barrel.

Coking Coal: Bituminous coal suitable for making coke. See **Coke, Coal**.

Commercial Sector: Defined economically, consists of business establishments that are not engaged in transportation or in manufacturing or other types of industrial activity (agriculture, mining, or construction). Commercial establishments include hotels, motels, restaurants, wholesale businesses, retail stores, laundries, and other service enterprises; religious and nonprofit organizations; health, social, and educational institutions; and Federal, State, and local governments. Street lights, pumps, bridges, and public services are also included if the establishment operating them is considered commercial.

Completion: The installation of permanent equipment for the production of oil or gas. If a well is equipped to produce only oil or gas from one zone or reservoir,

the definition of a well (classified as an oil well or gas well) and the definition of a completion are identical. However, if a well is equipped to produce oil and/or gas separately from more than one reservoir, a well is not synonymous with a completion.

Constant Dollars: See **Chained Dollars**.

Conventional Gasoline: Finished motor gasoline not included in the oxygenated or reformulated gasoline categories. Note: This category excludes reformulated gasoline blendstock for oxygenate blending (RBOB) as well as other blendstock.

Conversion Factor: A number that translates units of one system into corresponding values of another system. Conversion factors can be used to translate physical units of measure for various fuels into Btu equivalents. See **British Thermal Unit**.

Cost, Insurance, Freight (CIF): A type of sale in which the buyer of the product agrees to pay a unit price that includes the f.o.b. value of the product at the point of origin plus all costs of insurance and transportation. This type of transaction differs from a "delivered" purchase in that the buyer accepts the quantity as determined at the loading port (as certified by the Bill of Lading and Quality Report) rather than paying on the basis of the quantity and quality ascertained at the unloading port. It is similar to the terms of an f.o.b. sale, except that the seller, as a service for which he is compensated, arranges for transportation and insurance.

Crude Oil: A mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Crude oil may also include: (1) Small amounts of hydrocarbons that exist in the gaseous phase in natural underground reservoirs but are liquid at atmospheric pressure after being recovered from oil well (casinghead) gas in lease separators and that subsequently are commingled with the crude stream without being separately measured. (2) Small amounts of nonhydrocarbons produced with the oil, such as sulfur and other compounds. Note: In reporting crude oil data at various stages of the petroleum supply stream, EIA survey programs have definitional variations due to whether associated products or materials are counted with crude oil. Some products and other materials are either mixed with the crude oil and cannot be separately measured or they are logically associated with crude oil for accounting purposes. Crude oil reserves data contain separate estimates for lease condensate, whereas crude oil supply data include lease condensate. Crude oil supply data also include liquid hydrocarbons produced from tar sands, gilsonite, and oil shale.

Crude Oil f.o.b. Price: The crude oil price actually charged at the oil-producing country's port of loading. Includes deductions for any rebates and discounts or additions of premiums, where applicable. It is the actual price paid with no adjustment for credit terms.

Crude Oil (Including Lease Condensate): A mixture of hydrocarbons that exists in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Included are lease condensate and liquid hydrocarbons produced from tar sands, gilsonite, and oil shale. Drip gases are also included, but topped crude oil

(residual oil) and other unfinished oils are excluded. Where identifiable, liquids produced at natural gas processing plants and mixed with crude oil are likewise excluded.

Crude Oil Landed Cost: The price of crude oil at the port of discharge, including charges associated with the purchase, transporting, and insuring of a cargo from the purchase point to the port of discharge. The cost does not include charges incurred at the discharge port (e.g., import tariffs or fees, wharfage charges, and demurrage).

Crude Oil Refinery Input: The total crude oil put into processing units at refineries.

Crude Oil Stocks: Stocks of crude oil and lease condensate held at refineries, in pipelines, at pipeline terminals, and on leases.

Crude Oil Used Directly: Crude oil consumed as fuel by crude oil pipelines and on crude oil leases.

Cubic Foot (natural gas): A unit of volume equal to 1 cubic foot at a pressure base of 14.73 pounds standard per square inch absolute and a temperature base of 60° F.

Degree-Day Normals: Simple arithmetic averages of monthly or annual degree-days over a long period of time (usually the 30-year period 1961-1990). The averages may be simple degree-day normals or population-weighted degree-day normals.

Degree-Days, Cooling (CDD): The number of degrees per day that the daily average temperature is above 65° F. The daily average temperature is the mean of the maximum and minimum temperatures for a 24-hour period.

Degree-Days, Heating (HDD): The number of degrees per day that the daily average temperature is below 65° F. The daily average temperature is the mean of the maximum and minimum temperatures for a 24-hour period.

Degree-Days, Population-Weighted: Heating or cooling degree-days weighted by the population of the area in which the degree-days are recorded. To compute State population-weighted degree-days, each State is divided into from one to nine climatically homogeneous divisions, which are assigned weights based on the ratio of the population of the division to the total population of the State. Degree-day readings for each division are multiplied by the corresponding population weight for each division and those products are then summed to arrive at the State population-weighted degree-day figure. To compute national population-weighted degree-days, the Nation is divided into nine Census regions, each comprising from three to eight States, which are assigned weights based on the ratio of the population of the region to the total population of the Nation. Degree-day readings for each region are multiplied by the corresponding population weight for each region and those products are then summed to arrive at the national population-weighted degree-day figure.

Design Electrical Rating, Net: The nominal net electrical output of a nuclear unit as specified by the electric utility for the purpose of plant design.

Development Well: A well drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive.

Distillate Fuel Oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. Included are products known as No. 1, No. 2, and No. 4 fuel oils and No. 1, No. 2, and No. 4 diesel fuels. It is used primarily for space heating, on- and off-highway diesel engine fuel (including railroad engine fuel and fuel for agricultural machinery), and electric power generation.

Dry Hole: An exploratory or development well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well.

Electrical System Energy Losses: The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted-for uses.

Electricity Generation: The process of producing electric energy or transforming other forms of energy into electric energy. It is also the amount of electric energy produced or expressed in watt-hours (Wh).

Electricity Generation, Gross: The total amount of electric energy produced by the generating station or stations, measured at the generator terminals.

Electricity Generation, Net: Gross generation less electricity consumed at the generating plant for station use. Electricity required for pumping at pumped-storage plants is regarded as plant use and is deducted from gross generation.

Electricity Production: Net electricity (gross electricity output measured at generator terminals minus power plant use) generated by publicly and privately owned electric utilities. Excludes industrial electricity generation (except autogeneration of hydroelectric power).

Electricity Sales: The amount of kilowatt-hours sold in a given period of time; usually grouped by classes of service, such as residential, commercial, industrial, and other. "Other" sales include sales for public street and highway lighting and other sales to public authorities, sales to railroads and railways, and interdepartmental sales.

Electric Power Plant: A station containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or fission energy into electric energy.

Electric Utility: A corporation, person, agency, authority, or other legal entity or instrumentality that owns and/or operates facilities for the generation, transmission, distribution, or sale of electric energy, primarily for use by the public, and that files forms listed in the *Code of Federal Regulations*, Title 18, Part 141. Facilities that qualify as cogenerators or small power producers under the Public Utility Regulatory Policies Act are not considered electric utilities.

Electric Utility Sector: Privately and publicly owned establishments that generate, transmit, distribute, or sell electricity primarily for use by the public and meet the definition of an electric utility. Nonutility power producers are not included in the electric utility sector.

End-Use Sectors: The residential, commercial, industrial, and transportation sectors of the economy.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatt-hours, while heat energy is usually measured in British thermal units.

Energy Consumption: The use of energy as a source of heat or power or as an input in the manufacturing process.

Energy Source: A substance, such as petroleum, natural gas, or coal, that supplies heat or power. In Energy Information Administration reports, electricity and renewable forms of energy, such as biomass, geothermal, wind, and solar, are considered to be energy sources.

Ethane: A normally gaseous straight-chain hydrocarbon (C_2H_6). It is a colorless, paraffinic gas that boils at a temperature of $-127.48^\circ F$. It is extracted from natural gas and refinery gas streams.

Ethanol: See **Fuel Ethanol**.

Ethylene: An olefinic hydrocarbon (C_2H_4) recovered from refinery processes or petrochemical processes.

Exploratory Well: A well drilled to find and produce oil or gas in an unproved area, to find a new reservoir in a field previously found to be productive of oil or gas in another reservoir, or to extend the limit of a known oil or gas reservoir.

Exports: Shipments of goods from the 50 States and the District of Columbia to foreign countries and to Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

Extraction Loss: The reduction in volume of natural gas due to the removal of natural gas constituents, such as ethane, propane, and butane, at natural gas processing plants.

f.a.s.: See **Free Alongside Ship**.

Federal Energy Administration (FEA): A predecessor of the Energy Information Administration.

Federal Energy Regulatory Commission (FERC): The Federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification. FERC is an independent regulatory agency within the Department of Energy and is the successor to the Federal Power Commission.

Federal Power Commission (FPC): The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. It was abolished on September 30, 1977, when the Department of Energy was created. Its functions were divided between the Department of Energy and the

Federal Energy Regulatory Commission, an independent regulatory agency.

First Purchase Price: The marketed first sales price of domestic crude oil, consistent with the removal price defined by the provisions of the Windfall Profits Tax on Domestic Crude Oil (Public Law 96-223, Sec. 4998 (c)).

Flared Natural Gas: Natural gas burned in flares on the base site or at gas processing plants.

f.o.b. See **Free on Board**.

Footage Drilled: Total footage for wells in various categories, as reported for any specified period, includes (1) the deepest total depth (length of well bores) of all wells drilled from the surface, (2) the total of all bypassed footage drilled in connection with reported wells, and (3) all new footage drilled for directional sidetrack wells. Footage reported for directional sidetrack wells does not include footage in the common bore, which is reported as footage for the original well. In the case of old wells drilled deeper, the reported footage is that which was drilled below the total depth of the old well.

Former U.S.S.R.: See **U.S.S.R.**

Fossil Fuel: Any naturally occurring organic fuel, such as petroleum, coal, and natural gas.

Fossil-Fueled Steam-Electric Power Plant: An electricity generation plant in which the prime mover is a turbine rotated by high-pressure steam produced in a boiler by heat from burning fossil fuels.

Free Alongside Ship (f.a.s.): The value of a commodity at the port of exportation, generally including the purchase price, plus all charges incurred in placing the commodity alongside the carrier at the port of exportation.

Free on Board (f.o.b.): A transaction whereby the seller makes the product available within an agreed-on period at a given port at a given price. It is the responsibility of the buyer to arrange for the transportation and insurance.

Fuel Ethanol: An anhydrous, denatured aliphatic alcohol (C_2H_5OH) intended for motor gasoline blending. See **Oxygenates**.

Full-Power Operation: Operation of a nuclear generating unit at 100 percent of its design capacity. Full-power operation precedes commercial operation.

Gasohol: A blend of finished motor gasoline containing 10 percent or less alcohol (generally ethanol but sometimes methanol). See **Oxygenated Gasoline**.

Gas-Turbine Electric Power Plant: A plant in which the prime mover is a gas turbine. A gas turbine typically consists of an axial-flow air compressor, one or more combustion chambers where liquid or gaseous fuel is burned and the hot gases expand to drive the generator and then are used to run the compressor.

Gas Well: A well completed for the production of natural gas from one or more gas zones or reservoirs. (Wells producing both crude oil and natural gas are classified as oil wells.)

Geothermal Energy: Energy from the internal heat of the Earth, which may be residual heat, friction heat, or

a result of radioactive decay. The heat is found in rocks and fluids at various depths and can be extracted by drilling and/or pumping.

Gross Domestic Product (GDP): The total value of goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the supplier (that is, the workers and, for property, the owners) may be either U.S. residents or residents of foreign countries.

GT/IC: Gas turbine and internal combustion plants.

Heat Content of a Quantity of Fuel, Gross: The total amount of heat released when a fuel is burned. Coal, crude oil, and natural gas all include chemical compounds of carbon and hydrogen. When those fuels are burned, the carbon and hydrogen combine with oxygen in the air to produce carbon dioxide and water. Some of the energy released in burning goes into transforming the water into steam and is usually lost. The amount of heat spent in transforming the water into steam is counted as part of gross heat content but is not counted as part of net heat content. It is also referred to as the higher heating value. Btu conversion factors typically used in EIA represent gross heat content.

Heat Content of a Quantity of Fuel, Net: The amount of usable heat energy released when a fuel is burned under conditions similar to those in which it is normally used. Also referred to as the lower heating value. Btu conversion factors typically used in EIA represent gross heat content.

Heavy Oil: The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all petroleum used in steam-electric power plants is heavy oil.

Hydrocarbon: An organic chemical compound of hydrogen and carbon in the gaseous, liquid, or solid phase. The molecular structure of hydrocarbon compounds varies from the simplest (methane, the primary constituent of natural gas) to the very heavy and very complex.

Hydroelectric Power: The production of electricity from the kinetic energy of falling water.

Hydroelectric Power Plant: A plant in which the turbine generators are driven by falling water.

Hydroelectric Pumped Storage: Hydroelectricity that is generated during peak load periods by using water previously pumped into an elevated storage reservoir during off-peak periods when excess generating capacity is available to do so. When additional generating capacity is needed, the water can be released from the reservoir through a conduit to turbine generators located in a power plant at a lower level.

Imports: Receipts of goods into the 50 States and the District of Columbia from foreign countries and from Puerto Rico, the Virgin Islands, and other U.S. possessions and territories.

Independent Power Producer: Wholesale electricity producers (other than qualifying facilities under the Public Utilities Regulatory Policies Act of 1978) that are unaffiliated with franchised utilities in the area in

which the independent power producers are selling power and that lack significant marketing power. Unlike traditional electric utilities, independent power producers do not possess transmission facilities that are essential to the customers and do not sell power in any retail service territory where they have a franchise. See **Nonutility Power Producer**.

Industrial Sector: Comprises manufacturing industries, which make up the largest part of the sector, along with mining, construction, agriculture, fisheries, and forestry. Establishments in this sector range from steel mills to small farms to companies assembling electronic components.

Injections (Natural Gas): Natural gas injected into storage reservoirs

Internal Combustion Electric Power Plant: A power plant in which the prime mover is an internal combustion engine. Diesel or gas-fired engines are the principal types used in electric power plants. The plant is usually operated during periods of high demand for electricity.

Isobutane: A normally gaseous branch-chain hydrocarbon. It is a colorless paraffinic gas that boils at a temperature of 10.9° F. It is extracted from natural gas or refinery gas streams. See **Butane**.

Isobutylene: An olefinic hydrocarbon recovered from refinery processes or petrochemical processes.

Isopentane: A saturated branched-chain hydrocarbon obtained by fractionation of natural gasoline or isomerization of normal pentane.

Jet Fuel, Finished: A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in aviation reciprocating engines. Fuel specifications are provided in ASTM Specification D910 and Military Specification MIL-G-5572. Note: Data on blending components are not counted in data on finished aviation gasoline.

Jet Fuel, Kerosene-Type: A kerosene-based product with a maximum distillation temperature of 400° F at the 10-percent recovery point and a final maximum boiling point of 572° F. Fuel specifications are provided in ASTM Specification D 1655 and Military Specifications MIL-T-5624P and MIL-T-83133D (Grades JP-5 and JP-8). It is used primarily for commercial turbojet and turboprop aircraft engines.

Jet Fuel, Naphtha-Type: A fuel in the heavy naphtha boiling range, with an average gravity of 52.8 degrees API, 20 to 90 percent distillation temperatures of 290 to 470° F and meeting Military Specification MIL-T-5624L (Grade JP-4). It is used by the military for turbojet and turboprop engines.

Kerosene: A petroleum distillate having a maximum distillation temperature of 401° F at the 10-percent recovery point, a final boiling point of 572° F, and a minimum flash point of 100° F. Included are the two grades designated in ASTM D3699 (No. 1-K and No. 2-K) and all grades of kerosene called range or stove oil. Kerosene is used in space heaters, cook stoves, and water heaters; it is suitable for use as an illuminant when burned in wick lamps.

Kilowatthour (kWh): A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kilowatthour is equivalent to 3,412 Btu.

Landed Costs: The dollar-per-barrel price of crude oil at the port of discharge. Included are the charges associated with the purchase, transporting, and insuring of a cargo from the purchase point to the port of discharge. Not included are charges incurred at the discharge port (e.g., import tariffs or fees, wharfage charges, and demurrage charges).

Lease and Plant Fuel: Natural gas used in well, field, and lease operations (such as gas used in drilling operations, heaters, dehydrators, and field compressors) and used as fuel in natural gas processing plants.

Lease Condensate: A mixture consisting primarily of pentanes and heavier hydrocarbons, which is recovered as a liquid from natural gas in lease or field separation facilities. Note: This category excludes natural gas liquids, such as butane and propane, which are recovered at natural gas processing plants or facilities.

Light Oil: Lighter fuel oils distilled off during the refining process. Virtually all petroleum used in internal combustion and gas-turbine engines is light oil.

Lignite: The lowest rank of coal. Often referred to as brown coal, it is used almost exclusively as fuel for steam-electric power generation. It is brownish-black and has a high inherent moisture content, sometimes as high as 45 percent. The heat content of lignite ranges from 9 to 17 million Btu per ton on a moist, mineral-matter-free basis. The heat content of lignite consumed in the United States averages 14 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter).

Liquefied Natural Gas (LNG): Natural gas (primarily methane) that has been liquefied by reducing its temperature to -260° F at atmospheric pressure.

Liquefied Petroleum Gases (LPG): Ethane, ethylene, propane, propylene, normal butane, butylene, and isobutane produced at refineries or natural gas processing plants, including plants that fractionate new natural gas plant liquids.

Low-Power Testing: The period of time between a nuclear generating unit's initial fuel loading date and the issuance of its operating (full-power) license. The maximum level of operation during that period is 5 percent of the unit's design thermal rating.

Lubricants: Substances used to reduce friction between bearing surfaces or as process materials either incorporated into other materials used as processing aids in the manufacturing of other products or as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Other substances may be added to impart or improve certain required properties. Excluded are byproducts of lubricating oil refining, such as aromatic extracts derived from solvent extraction or tars derived from deasphalting. Included are all grades of lubricating oils from spindle oil to cylinder oil and those used in greases. Lubricant categories are paraffinic and naphthenic.

Marketed Production: Gross withdrawals less gas used for repressuring, quantities vented and flared, and nonhydrocarbon gases removed in treating or process-

ing operations. Includes all quantities of gas used in field and processing operations.

Metallurgical Coal: Coking coal and pulverized coal consumed in making steel.

Methane: A hydrocarbon gas (CH₄) that is the principal constituent of natural gas.

Methyl Tertiary Butyl Ether (MTBE): An ether, (CH₃)₃COCH₃, intended for motor gasoline blending. See **Oxygenates**.

Methanol: A light, volatile alcohol (CH₃OH) eligible for motor gasoline blending. See **Oxygenates**.

Miscellaneous Petroleum Products: All finished petroleum products not classified elsewhere—for example, petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils.

Motor Gasoline Blending: Mechanical mixing of motor gasoline blending components and oxygenates as required, to produce finished motor gasoline. Finished motor gasoline may be further mixed with other motor gasoline blending components or oxygenates, resulting in increased volumes of finished motor gasoline and/or changes in the formulation of finished motor gasoline (e.g., conventional motor gasoline mixed with MTBE to produce oxygenated motor gasoline).

Motor Gasoline Blending Components: Naphtha (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, xylene) used for blending or compounding into finished motor gasoline. These components include reformulated gasoline blendstock (RBOB) but exclude oxygenates (alcohols, ethers), butane, and pentanes plus. Note: oxygenates are reported as individual components and are included in the total for other hydrocarbons, hydrogens, and oxygenates.

Motor Gasoline, Finished: A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition. Motor gasoline, as defined in ASTM Specification D-4814 or Federal Specification VV-G-1690C, is characterized as having a boiling range of 122°F to 158°F at the 10-percent recovery point to 365°F to 374°F at the 90-percent recovery point. "Motor gasoline" includes conventional gasoline, all types of oxygenated gasoline including gasohol, and reformulated gasoline, but excludes aviation gasoline. Note: Data on blending components, as well as oxygenates, are not counted in data on finished motor gasoline.

Motor Gasoline Grades: The classification of gasoline by octane ratings. Each type of gasoline (conventional, oxygenated, and reformulated) is classified by three grades: regular, midgrade, and premium. Note: Gasoline sales are reported by grade in accordance with their classification at the time of sale. In general, automotive octane requirements are lower at high altitudes. Therefore, in some areas of the United States, such as the Rocky Mountain States, the octane ratings for the gasoline grades may be 2 or more octane points lower.

Regular Gasoline: Gasoline having an antiknock index, i.e., octane rating, greater than or equal to 85 and less than 88. Note: Octane requirements may vary by altitude. See **Motor Gasoline Grades**.

Midgrade Gasoline: Gasoline having an antiknock index, i.e., octane rating, greater than or equal to 88 and less than or equal to 90. Note: Octane requirements may vary by altitude. See **Motor Gasoline Grades**.

Premium Gasoline: Gasoline having an antiknock index, i.e., octane rating, greater than 90. Note: Octane requirements may vary by altitude. See **Motor Gasoline Grades**.

Motor Gasoline, Oxygenated: Finished motor gasoline, other than reformulated gasoline, having an oxygen content of 2.7 percent or higher by weight and required by the U.S. Environmental Protection Agency (EPA) to be sold in areas designated by EPA as carbon monoxide (CO) nonattainment areas. Note: Oxygenated gasoline excludes oxygenated fuels program reformulated gasoline (OPRG) and reformulated gasoline blendstock for oxygenate blending (RBOB). Data on gasohol that has at least 2.7 percent oxygen, by weight, and is intended for sale inside CO nonattainment areas are included in data on oxygenated gasoline. Other data on gasohol are included in data on conventional gasoline.

Motor Gasoline, Reformulated: Finished motor gasoline formulated for use in motor vehicles, the composition and properties of which meet the requirements of the reformulated gasoline regulations promulgated by the U.S. Environmental Protection Agency under Section 211(k) of the Clean Air Act. Note: This category includes oxygenated fuels program reformulated gasoline (OPRG) but excludes reformulated gasoline blendstock for oxygenate blending (RBOB).

Motor Gasoline Retail Prices: Motor gasoline prices calculated each month by the Bureau of Labor Statistics (BLS) in conjunction with the construction of the Consumer Price Index (CPI). Those prices are collected in 85 urban areas selected to represent all urban consumers—about 80 percent of the total U.S. population. The service stations are selected initially, and on a replacement basis, in such a way that they represent the purchasing habits of the CPI population. Service stations in the current sample include those providing all types of service (i.e., full-, mini-, and self-service).

Motor Gasoline (Total): For stock level data, a sum including finished motor gasoline stocks plus stocks of motor gasoline blending components but excluding stocks of oxygenates.

MTBE: See **Methyl Tertiary Butyl Ether**.

Nameplate Capacity: The maximum design production capacity specified by the manufacturer of a processing unit or the maximum amount of a product that can be produced running the manufacturing unit at full capacity.

Naphtha: A generic term applied to a petroleum fraction with an approximate boiling range between 122 and 400° F.

Natural Gas: A mixture of hydrocarbons (principally methane) and small quantities of various nonhydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs.

Natural Gas, Dry: The marketable portion of natural gas production, which is obtained by subtracting ex-

traction losses, including natural gas liquids removed at natural gas processing plants, from total production.

Natural Gas Marketed Production: Gross withdrawals of natural gas from production reservoirs, less gas used for reservoir repressuring; nonhydrocarbon gases removed in treating and processing operations; and quantities vented and flared.

Natural Gas Plant Liquids (NGPL): Natural gas liquids recovered from natural gas in processing plants and, in some situations, from natural gas field facilities, as well as those extracted by fractionators. Natural gas plant liquids are defined according to the published specifications of the Gas Processors Association and the American Society for Testing and Material as follows: ethane, propane, normal butane, isobutane, pentanes plus, and other products from natural gas processing plants (i.e., products meeting the standards for finished petroleum products produced at natural gas processing plants, such as finished motor gasoline, finished aviation gasoline, special naphthas, kerosene, distillate fuel oil, and miscellaneous products).

Natural Gas Wellhead Price: The wellhead price of natural gas is calculated by dividing the total reported value at the wellhead by the total quantity produced as reported by the appropriate agencies of individual producing States and the U.S. Minerals Management Service. The price includes all costs prior to shipment from the lease, including gathering and compression costs, in addition to State production, severance, and similar charges.

Natural Gasoline: A mixture of hydrocarbons (mostly pentanes and heavier) extracted from natural gas that meets vapor pressure, end-point, and other specifications for natural gasoline set by the Gas Processors Association. Includes isopentane, which is a saturated branch-chain hydrocarbon obtained by fractionation of natural gasoline or isomerization of normal pentane.

Net Summer Capability: The steady hourly output that generating equipment is expected to supply to system load, exclusive of auxiliary power, as demonstrated by testing at the time of summer peak demand.

Neutral Zone: A 6,200 square-mile area shared equally between Kuwait and Saudi Arabia under a 1992 agreement. The Neutral Zone contains an estimated 5 billion barrels of oil and 8 trillion cubic feet of natural gas.

Nonhydrocarbon Gases: Typical nonhydrocarbon gases that may be present in reservoir natural gas are carbon dioxide, helium, hydrogen sulfide, and nitrogen.

Nonutility Power Producer: A corporation, person, agency, authority, or other legal entity of instrumentality that owns electric generating capacity and is not an electric utility. Nonutility producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers) without a designated, franchised, service area that do not file forms listed in the Code of Federal Regulations, Title 18, Part 141. See **Cogenerator**; **Independent Power Producer**; and **Small Power Producer**.

Nuclear Electric Power: Electricity generated by an electric power plant whose turbines are driven by steam

generated in a reactor by heat from the fissioning of nuclear fuel.

Nuclear Electric Power Plant: A single-unit or multi-unit facility in which heat produced in one or more reactors by the fissioning of nuclear fuel is used to drive one or more steam turbines.

Nuclear Reactor: An apparatus in which the nuclear fission chain can be initiated, maintained, and controlled so that energy is released at a specific rate. The reactor includes fissionable material (fuel), such as uranium or plutonium; fertile material; moderating material (unless it is a fast reactor); a heavy-walled pressure vessel; shielding to protect personnel; provision for heat removal; and control elements and instrumentation.

Octane Rating: A number used to indicate gasoline's antiknock performance in motor vehicle engines. The two recognized laboratory engine test methods for determining the antiknock rating of gasolines are the Research method and the Motor method. To provide a single number as guidance to the consumer, the antiknock index $(R + M)/2$, which is the average of the Research and Motor octane numbers, was developed.

Offshore: That geographic area that lies seaward of the coastline. In general, the coastline is the line of ordinary low water along with that portion of the coast that is in direct contact with the open sea or the line marking the seaward limit of inland water.

Oil: See **Crude Oil**.

Oil Well: A well completed for the production of crude oil from one or more oil zones or reservoirs. Wells producing both crude oil and natural gas are classified as oil wells.

Operable Unit (Nuclear): In the United States, a nuclear generating unit that has completed low-power testing and been issued a full-power operating license by the Nuclear Regulatory Commission, or equivalent permission to operate.

Organization for Economic Cooperation and Development (OECD): Members are Australia, Austria, Belgium, Canada, Denmark, Faroe Islands, Finland, France, Germany, Greece, Greenland, Hawaiian Trade Zone, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States and its territories (Guam, Puerto Rico, and the Virgin Islands). In addition, Czech Republic, Hungary, Poland, and South Korea joined the OECD in 1996.

Organization of Petroleum Exporting Countries (OPEC): Countries that have organized for the purpose of negotiating with oil companies on matters of oil production, prices, and future concession rights. Current members are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

Oxygenated Gasoline: Finished motor gasoline having an oxygen content of 1.8 percent or higher, by weight. This product is required by the U.S. Environmental Protection Agency (EPA) to be sold in areas with higher-than-acceptable levels of carbon monoxide (CO), i.e., "nonattainment areas". These

nonattainment areas are identified by EPA on the basis of detailed CO measurements and States are required to submit plans to improve air quality [State Implementation Plans (SIP)]. Such a program may, at the State's discretion, address an area larger than its officially-designated nonattainment area(s). Note: For data on sales of oxygenated gasoline, any gasoline meeting the oxygen content specification and intended for use within the area designated by a SIP is counted as oxygenated gasoline. For data on production and supply of oxygenated gasoline, gasohol is included in the oxygenated gasoline category, regardless of where it is sold. Oxygenated gasoline excludes reformulated gasoline, oxygenated fuels program reformulated gasoline (OPRG), and reformulated gasoline blendstock for oxygenated blending (RBOB).

Oxygenates: Substances which, when added to gasoline, increase the amount of oxygen in that gasoline blend. Ethanol, MTBE, and methanol are common oxygenates.

PAD Districts: Petroleum Administration for Defense Districts. Geographic aggregations of the 50 States and the District of Columbia into five districts for the Petroleum Administration for Defense in 1950. The districts were originally instituted for economic and geographic reasons as Petroleum Administration for War (PAW) Districts, which were established in 1942.

Pentanes Plus: A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

Petrochemical Feedstocks: Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics.

Petroleum: A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and nonhydrocarbon compounds blended into finished petroleum products.

Petroleum Coke: See **Coke**, **Petroleum**.

Petroleum Coke, Catalyst: The carbonaceous residue that is deposited on and deactivates the catalyst used in many catalytic operations (e.g., catalytic cracking). Carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. That carbon or coke is not recoverable in a concentrated form.

Petroleum Coke, Marketable: Those grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon. Marketable petroleum coke may be sold as is or may be further purified by calcining.

Petroleum Consumption: The sum of all refined petroleum products supplied. For each refined petroleum product, the amount supplied is calculated by adding production and imports, then subtracting changes in primary stocks (net withdrawals are a plus quantity and net additions are a minus quantity) and exports.

Petroleum Imports: Imports of petroleum into the 50 States and the District of Columbia from foreign countries and from Puerto Rico, the Virgin Islands, and other U.S. territories and possessions. Included are imports

for the Strategic Petroleum Reserve and withdrawals from bonded warehouses for onshore consumption, offshore bunker use, and military use. Excluded are receipts of foreign petroleum into bonded warehouses and into U.S. territories and U.S. Foreign Trade Zones.

Petroleum Products: Products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Petroleum Products Supplied: An approximate measure of consumption. It measures the disappearance of the products from primary sources, i.e., refineries, blending plants, and bulk terminals. In general, products supplied in any given period is computed as follows: field production, plus imports, plus unaccounted-for crude oil (plus net receipts when calculated on a PAD District basis) minus stock change, minus crude oil losses, minus refinery inputs, and minus exports. See also **Petroleum Consumption**.

Petroleum Stocks, Primary: For individual products, quantities that are held at refineries, in pipelines, and at bulk terminals that have a capacity of 50,000 barrels or more, or that are in transit thereto. Stocks held by product retailers and resellers, as well as tertiary stocks held at the point of consumption, are excluded. Stocks of individual products held at gas processing plants are excluded from individual product estimates but are included in other oils estimates and total.

Photovoltaic Energy: Direct-current electricity generated from sunlight through solid-state semiconductor devices that have no moving parts.

Pipeline Fuel: Gas consumed in the operation of pipelines, primarily in compressors.

Plant Condensate: One of the natural gas liquids, mostly pentanes and heavier hydrocarbons, recovered and separated as liquid at gas inlet separators or scrubbers in processing plants.

Prime Mover: The engine, turbine, water wheel, or similar machine that drives an electric generator; or, for reporting purposes, a device that converts energy to electricity directly.

Primary Consumption: All energy consumed by end users excluding electricity but including the energy consumed to generate electricity.

Propane: A normally gaseous straight-chain hydrocarbon (C_3H_8). It is a colorless paraffinic gas that boils at a temperature of $-43.67^\circ F$. It is extracted from natural gas or refinery gas streams. It includes all products designated in ASTM Specification D1835 and Gas Processors Association Specifications for commercial propane and HD-5 propane.

Propylene: An olefinic hydrocarbon (C_3H_6) recovered from refinery or petrochemical processes.

Pumped Storage: See **Hydroelectric Pumped Storage**.

Refiner Acquisition Cost of Crude Oil: The cost of crude oil to the refiner, including transportation and fees. The composite cost is the weighted average of domestic and imported crude oil costs.

Refinery (petroleum): An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

Renewable Energy: Energy obtained from sources that are essentially inexhaustible (unlike, for example, the fossil fuels, of which there is a finite supply). Renewable sources of energy include wood, waste, photovoltaic, and solar thermal energy.

Repressuring: The injection of a pressurized fluid (such as air, gas, or water) into oil and gas reservoir formations to effect greater ultimate recovery.

Residential Sector: Consists of all private residences, whether occupied or vacant, owned or rented, including single-family homes, multifamily housing units, and mobile homes. Secondary homes, such as summer homes, are also included. Institutional housing, such as school dormitories, hospitals, and military barracks, generally are not included in the residential sector; they are included in the commercial sector.

Residual Fuel Oil: The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations and that conform to ASTM Specifications D396 and 975. Included are No. 5, a residual fuel oil of medium viscosity; Navy Special, for use in steam-powered vessels in government service and in shore power plants; and No. 6, which includes Bunker C fuel oil and is used for commercial and industrial heating, for electricity generation, and to power ships. Imports of residual fuel oil include imported crude oil burned as fuel.

Road Oil: Any heavy petroleum oil, including residual asphaltic oil used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades, from 0, the most liquid, to 5, the most viscous.

Rotary Rig: A machine used for drilling wells that employs a rotating tube attached to a bit for boring holes through rock.

Short Ton (coal): A unit of weight equal to 2,000 pounds.

SIC: See **Standard Industrial Classification**.

Small Power Producer: Under the Public Utility Regulatory Policies Act, a small power production facility (small power producer) generates electricity by using waste or renewable energy (biomass, conventional hydroelectric, wind, solar, and geothermal) as a primary energy source. Fossil fuels can be used, but renewable resources must provide at least 75 percent of the total energy input. See **Nonutility Power Producer**.

Solar Energy: Electricity produced from solar energy that heats a medium that powers the electricity-generating device.

Special Naphthas: All finished products within the naphtha boiling ranges that are used as paint thinner, cleaners or solvents. Those products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to

ASTM Specifications D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline, or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks, are excluded.

Spent Liquor: The liquid residue left after an industrial process; can be a component of waste materials used as fuel.

Standard Industrial Classification (SIC): A set of codes developed by the Office of Management and Budget which categorizes industries into groups with similar economic activities.

Startup Test Phase of Nuclear Power Plant: A nuclear power plant that has been licensed by the Nuclear Regulatory Commission to operate but is still in the initial testing phase, during which the production of electricity may not be continuous. In general, when the electric utility is satisfied with the plant's performance, it formally accepts the plant from the manufacturer and places it in commercial operation status. A request is then submitted to the appropriate utility rate commission to include the power plant in the rate base calculation.

Steam Coal: All nonmetallurgical coal.

Steam-Electric Power Plant: A plant in which the prime mover is a steam turbine. The steam used to drive the turbine is produced in a boiler where fossil fuels are burned.

Still Gas (Refinery Gas): Any form or mixture of gas produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane, ethane, ethylene, normal butane, butylene, propane, and propylene. It is used primarily as refinery fuel and petrochemical feedstock.

Strategic Petroleum Reserve (SPR): Petroleum stocks maintained by the Federal Government for use during periods of major supply interruption.

Subbituminous Coal: A coal that ranges in properties from those of lignite to those of bituminous coal. It may be dull, dark brown or black, soft and crumbly, at the lower end of the range, to bright, jet black, hard, and relatively strong, at the upper end. It is used primarily as fuel for steam-electric power generation. Subbituminous coal contains 20 to 30 percent inherent moisture by weight. The heat content of subbituminous coal ranges from 17 to 24 million Btu per ton on a moist, mineral-matter-free basis. The heat content of subbituminous coal consumed in the United States averages 18 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter).

Supplemental Gaseous Fuels: Any gaseous substance that, introduced into or commingled with natural gas, increases the volume available for disposition. Such substances include, but are not limited to, propane-air, refinery gas, coke oven gas, still gas, manufactured gas, biomass gas, or air or inert gases added for Btu stabilization.

Synthetic Natural Gas (SNG): A manufactured product chemically similar in most respects to natural gas, resulting from the conversion or reforming of petro-

leum hydrocarbons. It may easily be substituted for, or interchanged with, pipeline quality natural gas. Also referred to as substitute natural gas.

Terawatthours: Billion kilowatthours.

Thermal Conversion Factor: See **Conversion Factor**.

Total Consumption: See **Energy Consumption, End-Use**.

Transportation Sector: Consists of private and public vehicles that move people and commodities. Included are automobiles, trucks, buses, motorcycles, railroads and railways (including streetcars), aircraft, ships, barges, and natural gas pipelines.

Unaccounted-for Crude Oil: Arithmetic difference between the calculated supply and the calculated disposition of crude oil. The calculated supply is the sum of crude oil production and imports, less changes in crude oil stocks. The calculated disposition of crude oil is the sum of crude oil input to refineries, crude oil exports, crude oil burned as fuel, and crude oil losses.

Unfinished Oils: All oils requiring further refinery processing except those requiring only mechanical blending. Includes naphthas and lighter oils, kerosene and light gas oils, heavy gas oils and residuum.

Unfractionated Stream: Mixtures of unsegregated natural gas liquid components, excluding those in plant condensate. This product is extracted from natural gas.

Underground Storage: The storage of natural gas in underground reservoirs at a different location from which it was produced.

United States: Unless otherwise noted, "United States" in this publication means the 50 States and the District of Columbia. U.S. exports include shipments to U.S. territories, and imports include receipts from U.S. territories.

Useful Thermal Output: The thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application, i.e., total thermal energy made available for processes and applications other than electrical generation.

U.S.S.R.: The Union of Soviet Socialist Republics consisted of 15 constituent republics: Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. As a political entity, the U.S.S.R. ceased to exist as of December 31, 1991.

Vented Natural Gas: Gas released into the air on the base site or at processing plants.

Vessel Bunkering: Includes sales for the fueling of commercial or private boats, such as pleasure craft, fishing boats, tugboats, and ocean-going vessels, including vessels operated by oil companies. Excluded are volumes sold to the U.S. Armed Forces.

Waste Energy: Garbage, bagasse, sewerage gas, and other industrial, agricultural, and urban refuse used to generate electricity.

Waxes: Solid or semisolid material derived from petroleum distillates or residues. Waxes are light-colored,

more or less translucent crystalline masses, slightly greasy to the touch, consisting of a mixture of solid hydrocarbons in which the paraffin series predominates. Included are all marketable waxes, whether crude scale or fully refined. Waxes are used primarily as industrial coating for surface protection.

Wellhead Price: The value of crude oil or natural gas at the mouth of the well.

Well Servicing Unit: Truck-mounted equipment generally used for downhole services after a well is

drilled. Services include well and recompletions, maintenance, repairs, workovers, and well plugging and abandonments. Jobs range from minor operations, such as pulling the rods and rod pumps out of an oil well, replacing the pump and rerunning the assemblage into the well, to major workovers, such as milling out and repairing collapsed casing. Well depth and characteristics determine the type of equipment used.

Wind Energy: The kinetic energy of wind converted into mechanical energy by wind turbines (e.g., blades rotating from a hub) that drive generators to produce electricity.

Nuclear power supplied 20.9 percent of the total net generation of electricity in March 2000 compared with 21.1 in March 1999.

Energy Plugs:

State Energy Prices and Expenditures
Renewable Energy Potential on Indian Lands

This publication is available on the
Web at: www.eia.doe.gov/mer.

Expanded Motor Vehicle Coverage
See Table 1.10

Timing of Release: *MER* data are normally released in the afternoon of the third-to-last work-day of each month and are usually available electronically the following day.

Cover Image: Optical glass fibers, though many times thinner than a human hair, carry vastly greater quantities of data than metallic wires, occupy less space, and are more secure. First introduced in the 1970s, high-purity optical fibers are capable of transmitting data over long distances and have replaced wires in many telecommunications, computing, and electronics applications.

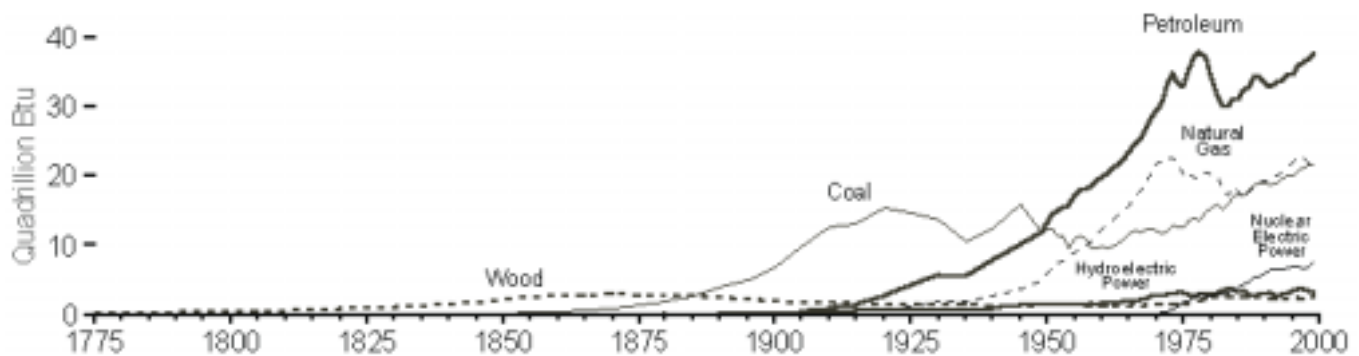
Except for nuclear electric power revisions, an update was not available for this table.

Energy Plug

Annual Energy Review 1999

As shown in the latest edition of the Energy Information Administration's *Annual Energy Review*, a close examination of America's entire energy history reveals dramatic shifts in the Nation's reliance on energy resources and a picture of continual change (see figure).

Energy Consumption in the United States, 1775-1999



Source: Energy Information Administration.

In addition to substantial (though unrecorded) quantities of human, animal, water, and wind power, wood fueled the country from its earliest years through the middle of the 19th century. Reliance on wood gave way to coal in the second half of the 19th century. Coal remained vital to the energy mix, but it, too, was eventually surpassed by other newly developed resources—petroleum and natural gas.

The 20th century witnessed immense growth in fossil-fuel consumption as well as the development and maturation of hydroelectric power, which has continued to provide a dependable stream of energy. In the second half of the century, yet another source of energy came of age in the form of nuclear electric power, which also made a significant contribution to fulfilling the energy requirements of the Nation.

Annual Energy Review 1999 is a comprehensive statistical and graphical history of energy in the United States, documenting milestones and long-term trends in major energy data series, such as production, consumption, trade, storage, pricing, and others. Many of the annual time series run from 1949 through 1999, creating a half-century historical context for the data published in EIA's companion *Monthly Energy Review*. Extensive appendices and a glossary help make *Annual Energy Review 1999* a standard-setting reference.

Annual Energy Review 1999, DOE/EIA-0384(99); 412 pages, 158 tables, 144 figures, 5 diagrams. To order a hard copy of the report, use the order form in the back of this publication. To access the report via the Internet, go to www.eia.doe.gov and click on "Historical Data" and then "Summary Data." Contact wmaster@eia.doe.gov or call 202-586-8959 if you have problems. Questions about the report's content should be directed to Leigh Carleton, Office of Energy Markets and End Use, at leigh.carleton@eia.doe.gov or 202-586-1132. For general information about energy, contact the National Energy Information Center at infoctr@eia.doe.gov or 202-586-8800.



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